FOUNDRY
EST. 1902 TRADE JOURNAL
WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL
VOL. III
No. 2350
DECEMBER 21, 1961
Registered at the G.P.O. as a Newspaper
Offices: John Adam House, John Adam St., London, W.C.2
Single Copy 1/-. By Post 1/4. Annual Subscription, Home 52/-, Abroad 60/- (Prepaid)

*Christmas Greetings*

*and*

*Best Wishes*

*for a*

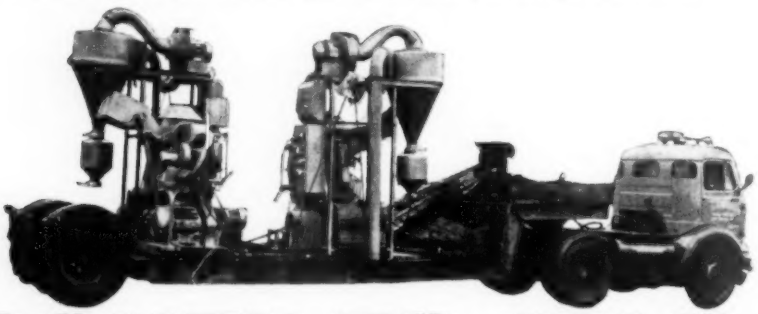
*Happy and Prosperous New Year*

**FOUNDRY PLANT & MACHINERY LTD**
**GLASGOW**

# TWO MORE FORDATH COMPACT COATERS

Such was the reception of the new 150 Compact Coater at the Milan Foundry Exhibition last October, that even our highest hopes were surpassed.

Orders from Italy and elsewhere on the continent for this new "packaged deal" have proved conclusively that FORDATH have brought Shell Sand Coating within the reach of the smaller user, for Shell Mould and Shell Core operations. This new Coater can provide 2 tons of resin coated sand per 8 hour shift in 150 lb. batches. The unit is completely self-contained with integral electric heater, control panel with time-cycle selection and pneumatic sand loader, the only requirement at installation is the connection of air and electric power lines.



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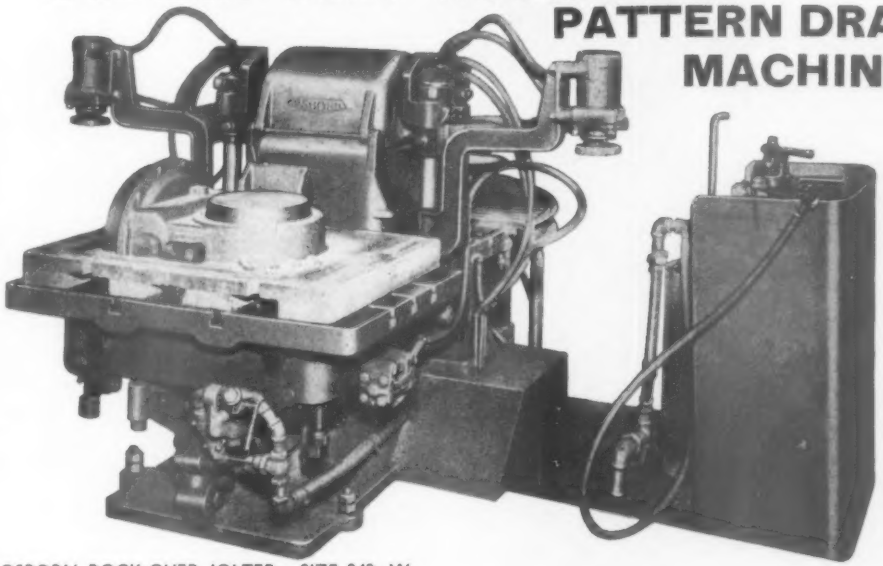
FORDATH

Bastable

# JACKMAN – BUILT

## OSBORN JOLT ROCK-OVER PATTERN DRAW MACHINES



OSBORN ROCK-OVER JOLTER. SIZE 242. W.

| | 242 W. M/C | 643 M/C |
|---|---|---|
| MAX. BOX DIMENSIONS OVERALL:— | | |
| LENGTH | OPEN END | OPEN END |
| WIDTH | 30″ | 38″ |
| JOLT CAPACITY | 1500 lbs. | 2000 lbs. |
| TABLE SIZE | 29″ x 42″ | 35″ x 50″ |
| DRAW STROKE UP TO | 19″ | 21″ |
| COMBINED BOX SPACE & PATTERN DRAW | 31″ | 33″ |

PNEUMATIC CLAMPS OPERATE IN TANDEM

OPEN ENDS PERMIT WIDE VARIATION OF BOX LENGTH

AIR CLAMPS LOCK LEVELLING MECHANISM WHICH TAKES CARE OF VARIATIONS IN BOTTOM BOARDS

AIR CONTROLLED PATTERN DRAW GIVES SLOW & FAST DRAW

CONVEYOR ROLLER ON LEVELLING MECHANISM CAN BE ARRANGED FOR ROLL-OUT EITHER ON CENTRE LINE OF MACHINE OR AT RIGHT ANGLES

'T' SLOTS ARE PROVIDED IN TABLE FOR QUICK PATTERN CHANGE

## J. W. JACKMAN & COMPANY LIMITED

**VULCAN WORKS · BLACKFRIARS ROAD · MANCHESTER 3**

*Telephone:* DEAnsgate 4648-three lines *Telegrams:* Blast, Manchester

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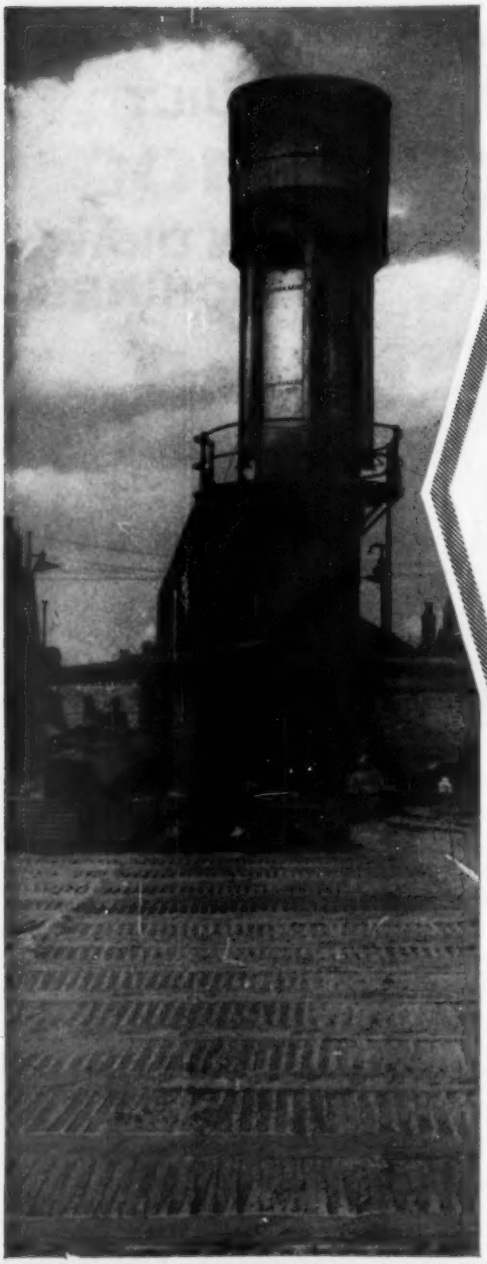

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Cold Blast

**PIG IRON**

**REFINED PIG IRON**
FOR HIGH DUTY CASTINGS

**CHILLED IRONS**
FOR CHILLED CASTINGS

**REFINED HEMATITES**
FOR MALLEABLE CASTINGS

***In 15 ton casts direct from receiver to required analysis***

Castings made from these irons have greater density and toughness. You will have fewer rejections, greater freedom from cracks, breaks and other defects.

**SPECIAL NICKEL & CHROME ALLOYS**

Hand Samples on Request

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'Aro-Broomwade'
PNEUMATIC HOISTS
THE SMALL HOISTS
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One-ton Model lifts 1 ton at 12 ft. per minute. Pendant Type weighs 48 lbs. Pull Type weighs 43 lbs.
Both Models available with roller or link chains. Ideal for Machine Shops and Loading Bays. Cuts out crane waiting time and . . . SAVES YOU MONEY.
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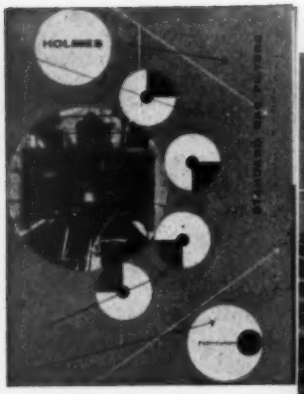
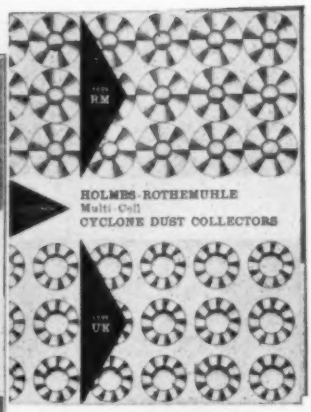
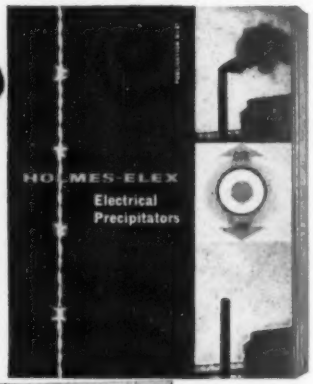


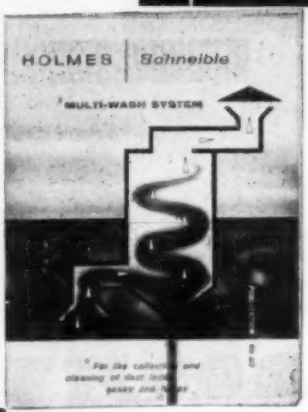



# Which?




**Which type of dust collection and control plant is most suitable, both technically and economically, for your particular application? A complete answer to this question lies within the pages of the various brochures illustrated. Have these brochures before you when you decide.**

*Ask for technical literature GCD/23*

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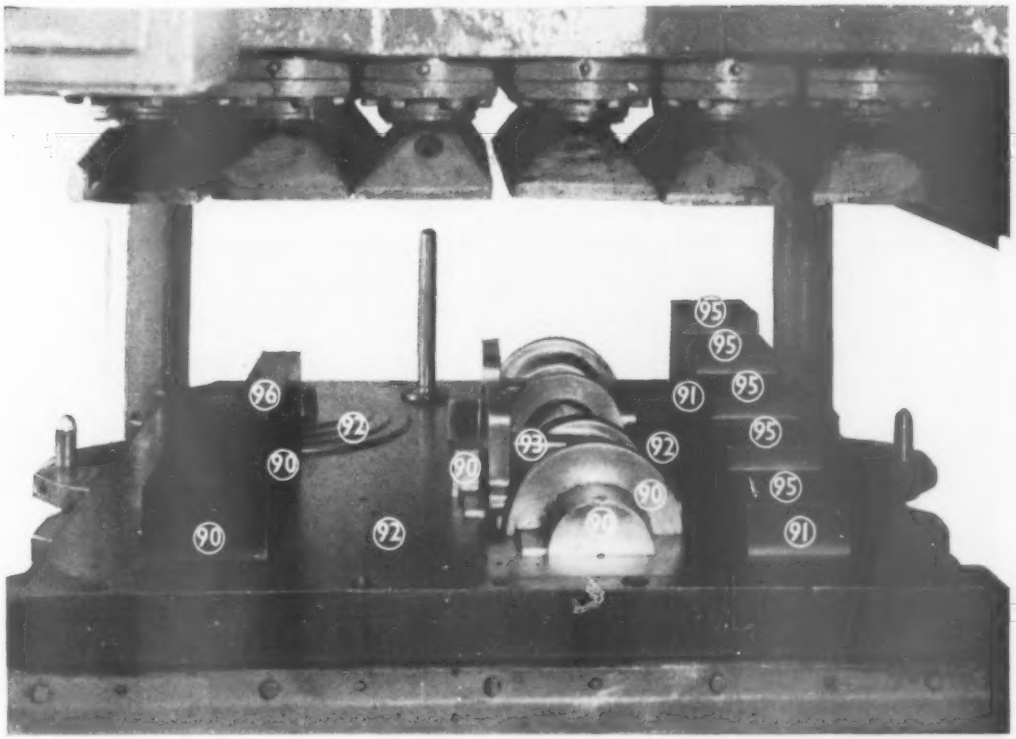



THE

# HERMAN

# Moldmaster

(PATENTED)

**Check the hardness figures quoted, particularly on high and low spots and vertical walls. These illustrate the efficiency of the Moldmaster method of using oildraulic, self contouring multiple feet (4 x 4 in.)**

*no jolting . . . no flat ramming*

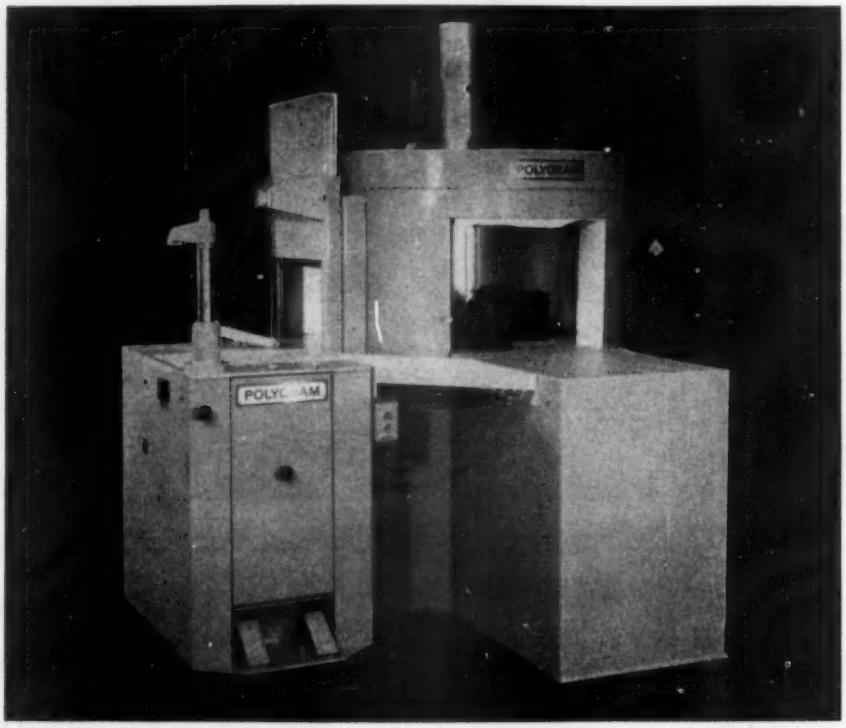
*Built in England by*

**PNEULEC LIMITED, SMETHWICK, Nr. BIRMINGHAM**

# The POLYGRAM 8*

## CMU SHELL COREMAKER

**for Jobbing Foundries**




Designed to bring all the economic and technical advantages of shell cores into *your* foundry, the latest Polygram CMU Shell Coremaker is the fruit of 12-years of continuous research by the only British Specialists in Shell Moulding and Coremaking. Note that the unit construction enables you to fit a CMU core blower or oven into your existing layout and to expand it into a full CMU Shell Coremaker at *your* convenience.

8* *Features of the Polygram CMU Shell Coremaker*

- Maximum Versatility
- Maximum Complexity-of-Core
- Minimum Handling
- Minimum Maintenance
- Maximum Quality
- Maximum Production
- Minimum Skill
- Minimum Heat

Designed by Foundrymen—Built by Engineers

Write **NOW** for details to

**Polygram** THE FIRST NAME IN SHELL MOULDING

*Casting Company Limited*

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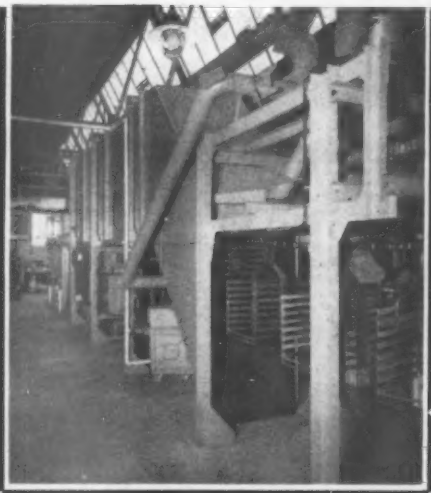
*Serving the foundrymen of tomorrow—today*



Better Drying

WITH 'NEWSTAD' CORE STOVES

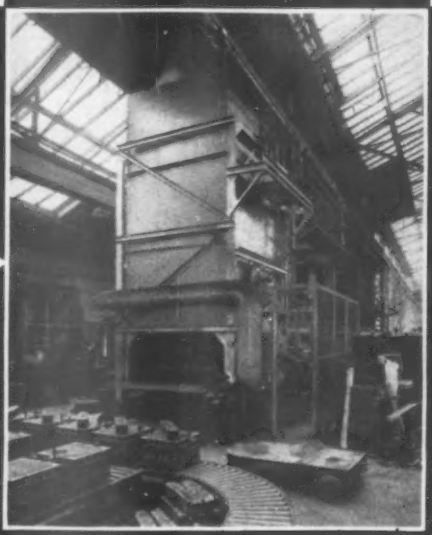


Photo by courtesy of H. & J. Hall Ltd., Dartford, Kent.

Newstad Continuous Core Stoves with our well known recirculation system give reduced drying times, low fuel consumption, better drying and closer temperature control.

Vertical stoves with single or multi-loop conveyors can be supplied with cooling chamber and automatic loading and unloading equipment.

Horizontal stoves can be loaded at the coremakers bench, and unloaded where the dried cores are required, eliminating the need for handling hot coreplates. Oil, Gas or Coke Fired.

**MODERN FURNACES and STOVES LIMITED**

*Builders of* INDUSTRIAL FURNACES

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$CO_2$ PROCESS BINDERS
EXOTHERMIC POWDERS
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*Manufactured by:-*

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# HEPBURN • Pangborn

*Solve the Problem*

This company produces a diversity of castings in alloy iron and hematite iron. These include ingot moulds for the steel industry, brake drums and liners for Public Passenger vehicles, machine tool castings, gear wheel blanks, Colliery castings and General Engineering castings. The problem here was to find a suitable Shot Blast Machine to clean castings from one pound to two tons at lowest total cost and to speed production.

*for* **ALLOY STEEL & IRON CO · CHESTERFIELD & SHEFFIELD**

**THE SOLUTION . . .**

After seeing the Pangborn LK 6ft. Rotablast at the 1958 Foundry Exhibition they decided to instal this machine to replace an Airless Rotary Barrel which was limited to size and weight of castings it was able to clean.

●

**THE RESULTS . . .**

1 Machine easily installed.
2 No Foundations required.
3 All Castings produced are now cleaned by machine.
4 50 per cent. increase in Output is now cleaned by same number of operatives.
5 No Breakages of Thin Castings.
6 Considerable saving of shot.
7 Fettling keeps pace with output.
8 Perfectly clean Castings to customers on time.

Blasting time three minutes

# HEPBURN CONVEYOR Co. Ltd.

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Tel. Nos. 3695/6 & 7
**WAKEFIELD, Yorks.**

★ These machines embody either the B.S.C.R.A. or the B.C.I.R.A. Patent Systems of Dust Control and comply with the new Government Regulation 1 of the Grinding of Metals (Misc. Indus.) Regulations, and Regulation 7, para. (6) of the Iron and Steel Foundries Regulations, 1953.

ROWLAND

## HIGH SPEED *"TWIN DRIVE"*

# FLOOR GRINDERS

★ Built in three sizes with wheels 18in. dia., 24in. dia. and 28in. dia. respectively. Also available in the Single Wheel Type in all sizes. Details on request.

★ Separate driving motors provide independent drive and control to each wheel.

★ Patent Compulsory Speed Change Device maintains maximum surface speed.

★ Efficient, foolproof Safety Devices provide adequate protection.

★ Wheels are collet mounted, not on spindle end, facilitating wheel change and reducing wear of spindle and nut.

★ Totally enclosed motors avoid electrical breakdown.

★ Short oversize spindles give maximum rigidity.

★ Precision pre-loaded A.C. and roller bearings, allied with sturdy all-steel construction give longest life and smoothest running, and maximum wheel performance.

**F. E. ROWLAND & CO. LTD**

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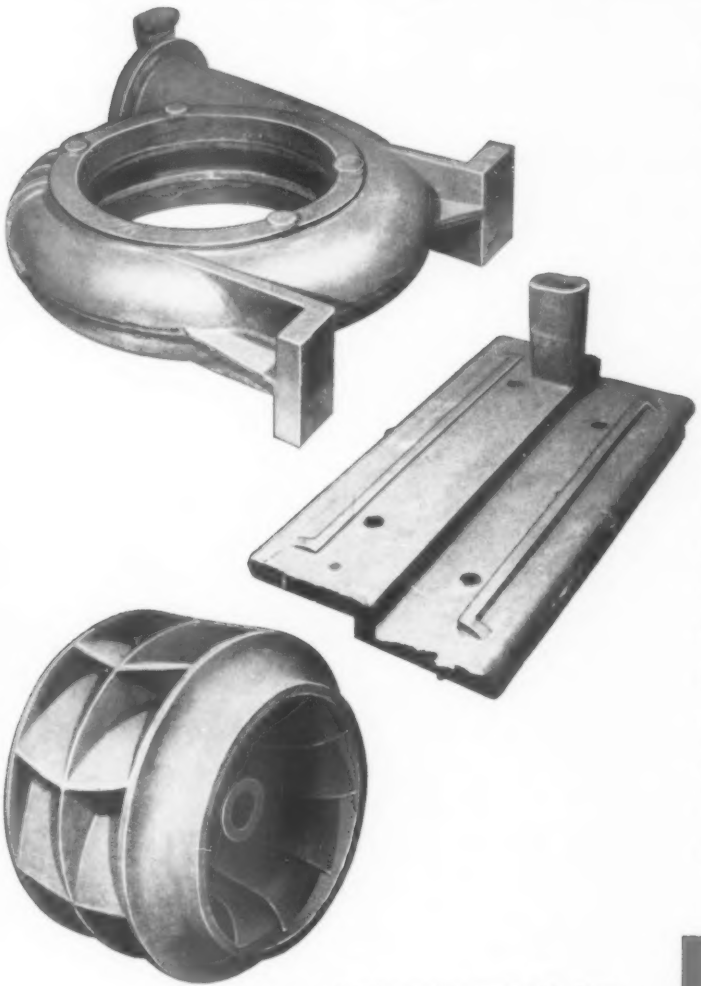
# Foseco*



*Alloy iron castings produced by Sheepbridge Equipment Ltd., Foundry Division, Chesterfield, where I.P.S.1. is regularly used when making up mould washes.*

## WORLD WIDE SERVICE FOR FOUNDRYMEN

*FOSECO* 'fired' dressings with I.P.S.1. protect your product and your reputation . . . and all *FOSECO* inflammable dressings contain I.P.S.1. Consistent and not expensive, they burn smoothly and evenly, giving the best possible finish. To make the most of your castings use *FOSECO* Mould and Core Dressings containing I.P.S.1.—isopropyl alcohol—the ideal carrier.

Sole distributors of I.P.S.1. and I.P.S.2. to the Foundry Industry in the United Kingdom and Republic of Ireland for Shell Chemical Company Limited.

* *Registered Trade Marks.*

SHELL

**FOSECO LIMITED**

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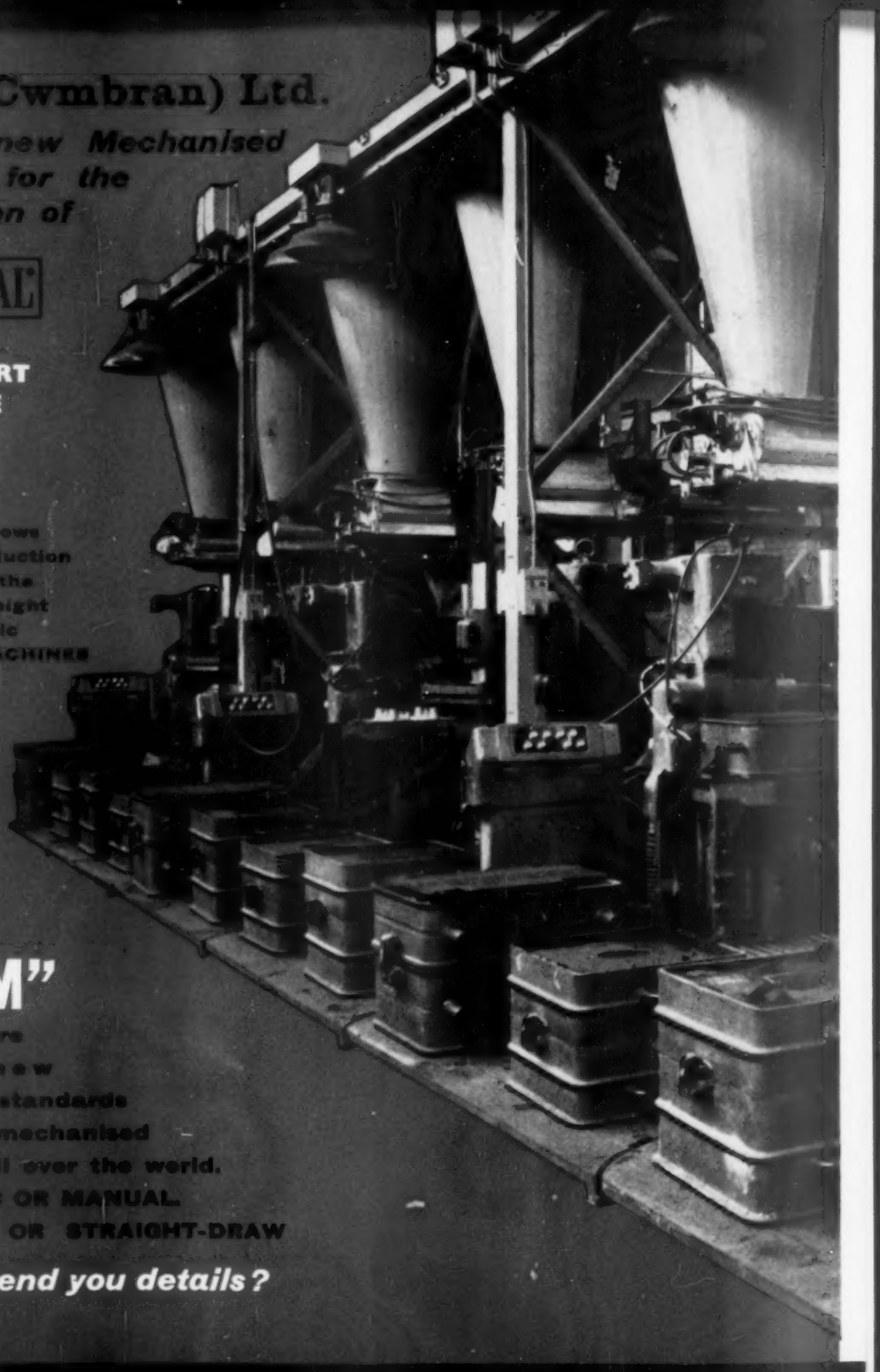
## GKN (Cwmbran) Ltd.

*open a new Mechanised Foundry for the production of*

MONOMAL

**BLACKHEART MALLEABLE CASTINGS**



Photograph shows the mould production section where the pace is set by eight B.Q.1. Automatic MOULDING MACHINES

# "B M M"

machines are setting new production standards in modern mechanised foundries all over the world.
AUTOMATIC OR MANUAL.
TURNOVER OR STRAIGHT-DRAW

***May we send you details?***

## BRITISH MOULDING MACHINES LIMITED

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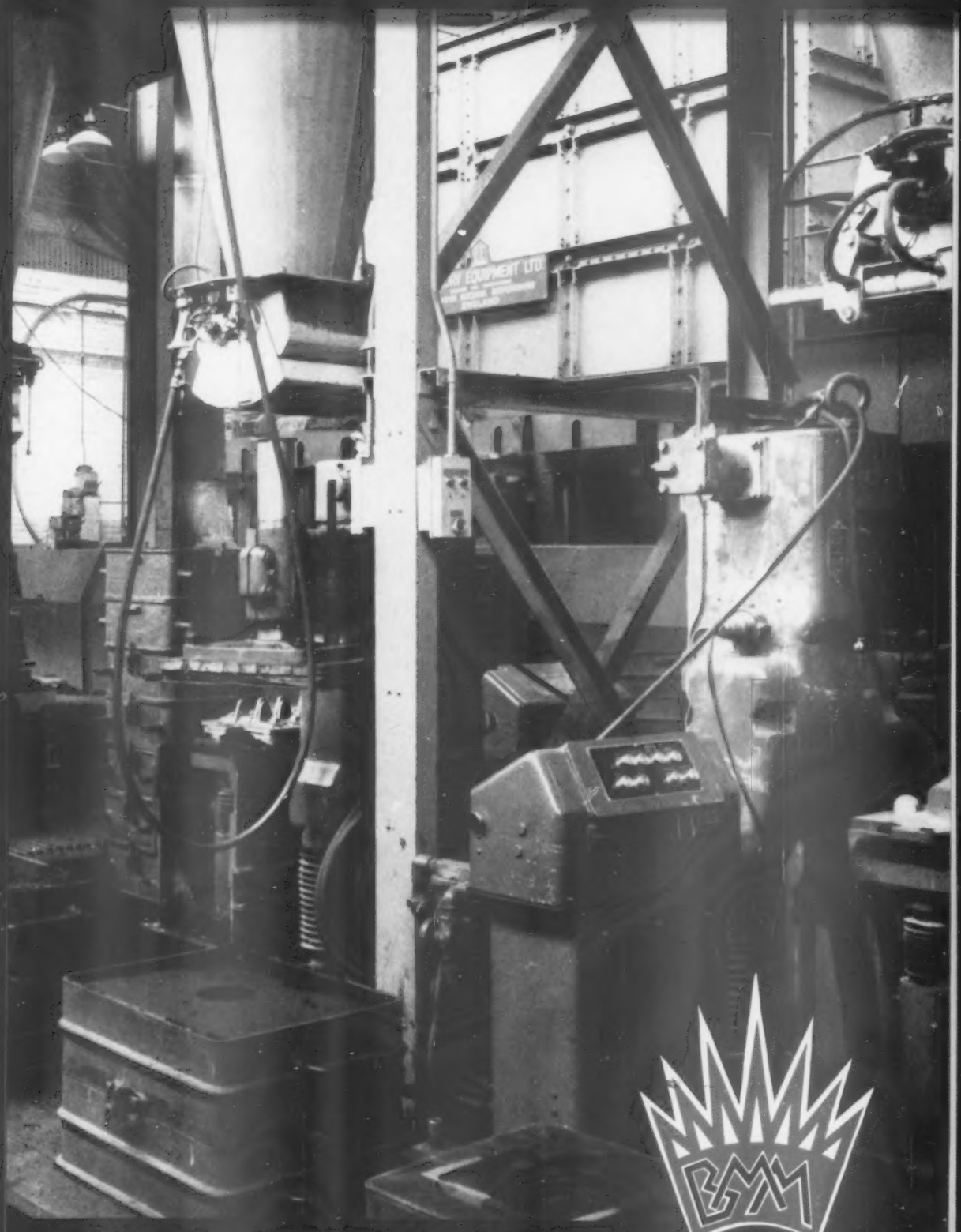

WESTON WORKS - FAVERSHAM - KENT

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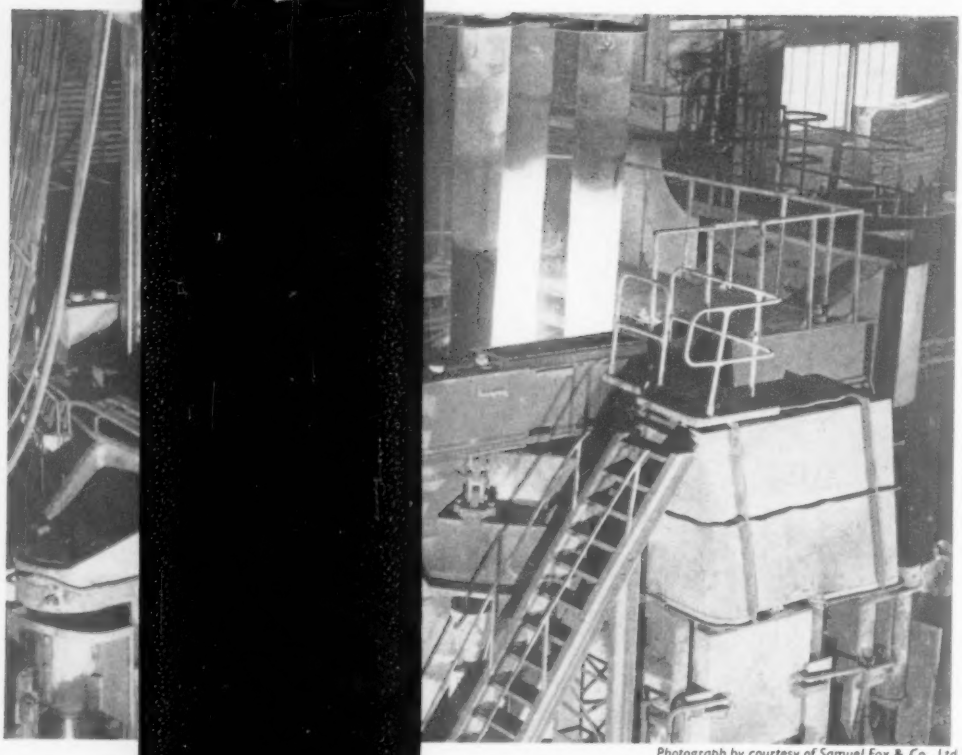
# Giving you dependable electrodes



Photograph by courtesy of Samuel Fox & Co., Ltd.

Specially selected raw materials, controlled manufacturing conditions, careful processing—this is the background to the day-in day-out dependable performance you can rely on with Acheson electrodes. These vital factors give you an optimum combination of :

- **LOW RESISTANCE**
- **HIGH MECHANICAL STRENGTH AT OPERATING TEMPERATURES**
- **EXCEPTIONAL THERMAL SHOCK RESISTANCE**

**GRAPHITE ELECTRODES**

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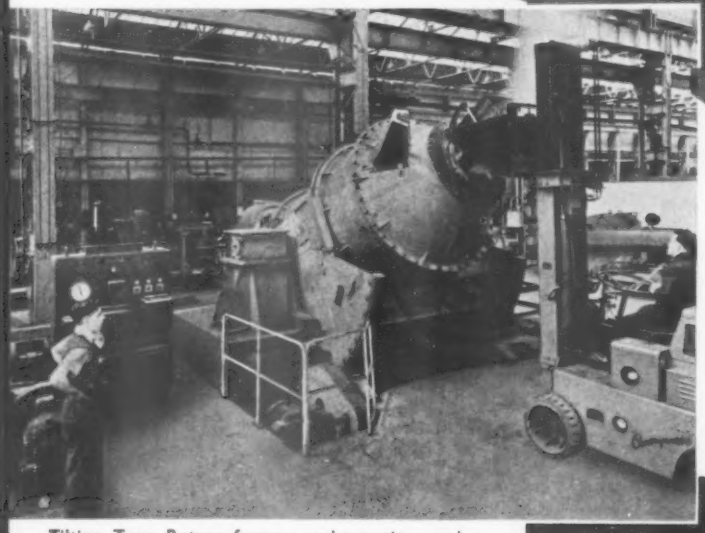
**Phone : ROTHERHAM 4836**

# ROTARY FURNACES

## FOR MALLEABLE IRONS

AT LOWEST PRODUCTION COST PER TON



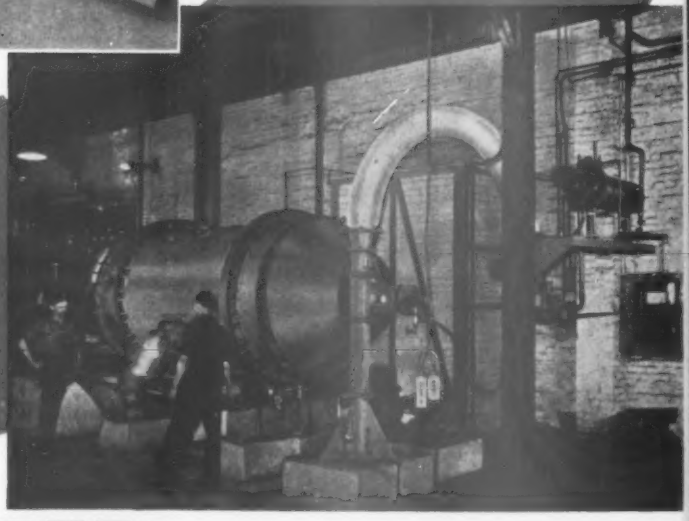
Tilting Type Rotary furnace reduces time and labour for charging. The furnace may be tilted to a vertical position for relining.

**Furnace Capacities up to 10 Tons.**

**AUTOMATIC COMBUSTION CONTROL EQUIPMENT:** THIS HIGHLY DEVELOPED SYSTEM CONTROLS OIL AND AIR BY WEIGHT AND AUTOMATICALLY COMPENSATES FOR DIFFERENCES IN BAROMETRIC PRESSURE AND TEMPERATURE THUS ENABLING ANALYSES TO BE ACCURATELY FORECAST AND MAINTAINED WITH MELTING LOSSES REDUCED TO AN ABSOLUTE MINIMUM.

## ADVANTAGES OF THE OIL-FIRED ROTARY FURNACE

- Ability to superheat to very high temperatures.
- Rapid melting.
- Flexibility of production.
- Simplicity of operation.
- High thermal efficiency.
- Minimum Maintenance and Labour.



# MONOMETER MANUFACTURING CO. LTD.

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Temple Bar 9025

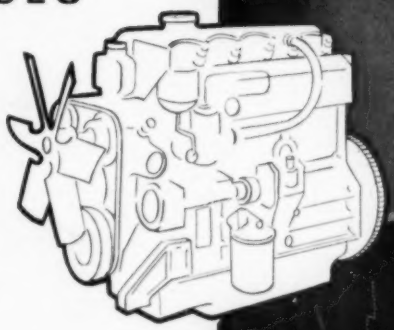
BIRLEFCO

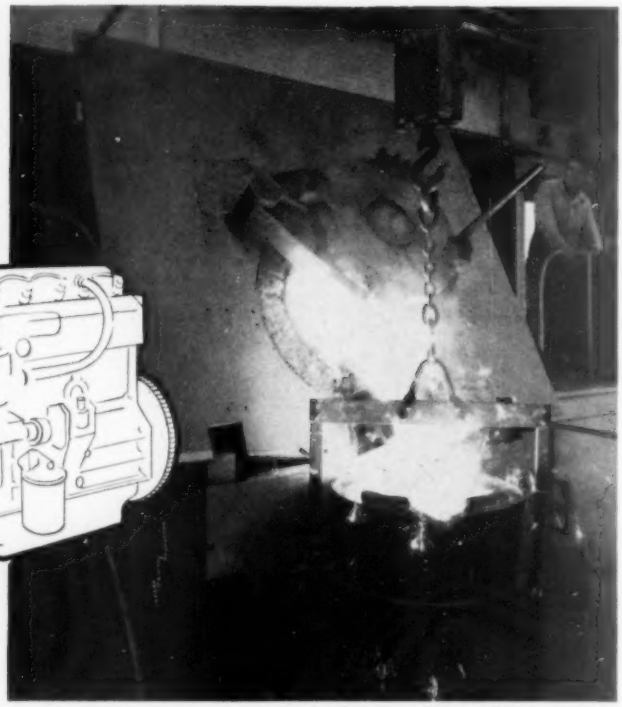
FURNACES

AS

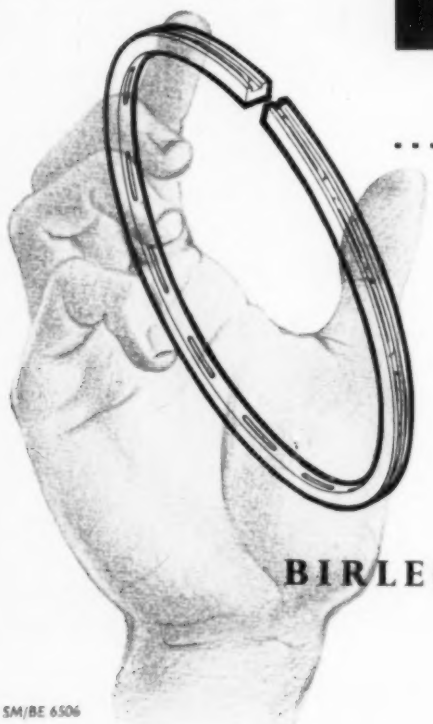
BIG

OR SMALL...





*A mains Frequency furnace of 30 cwt. capacity and rated at 450kW. for melting iron and steel.*



...AS PRODUCTION DEMANDS

Whether your melting equipment is geared for batch or continuous production requirements, there is a Birlefco furnace to keep the job in hand. A Birlefco mains frequency furnace, such as that illustrated, is equally suited to the production of ferrous or non-ferrous materials.
Wherever there's metal to be melted Birlefco provide a unique combination of design experience and manufacturing skill, always abreast of new trends and new techniques.

*Specialists in all types of melting equipment; Arc Furnaces from 1 to 150 tons capacity; Mains Frequency and High Frequency Melting Plant from 10 lbs. to 20 tons capacity; Induction Heating Equipment.*

BIRLEC-EFCO (MELTING) LTD

Westgate · ALDRIDGE · Staffs

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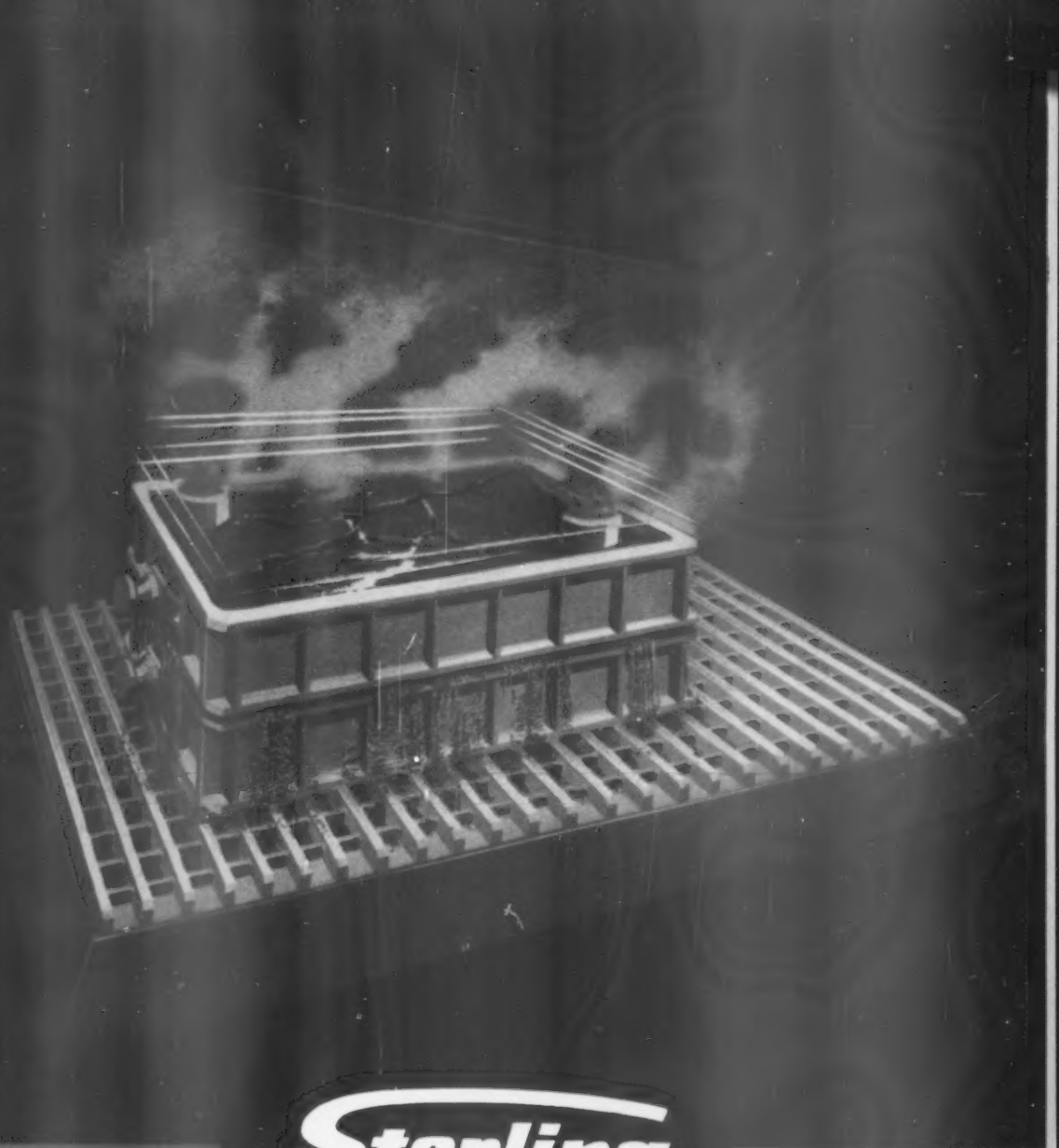
SM/BE 6506



Sterling

# MOULDING BOXES & SHAKE-OUT MACHINES

*in use in more than 9000 foundries throughout the world*

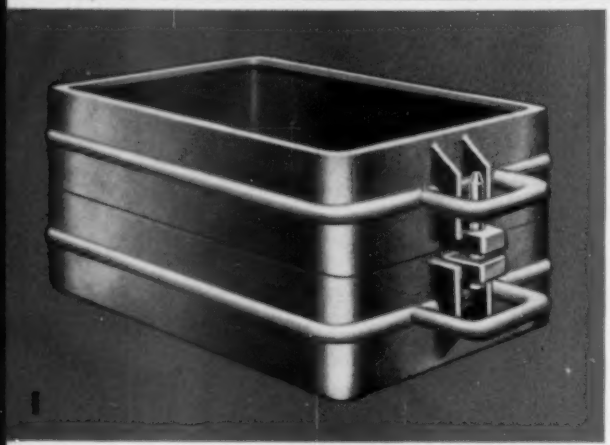
STERLING FOUNDRY SPECIALTIES LIMITED, BEDFORD, ENGLAND

415 Coupon

P.T.O.

# Sterling

**Moulding Boxes in light or heavy section and for heavy duty.**
**Shake-out machines 2 cwt to 25 tons capacity. Grid sizes up to 96" × 144"**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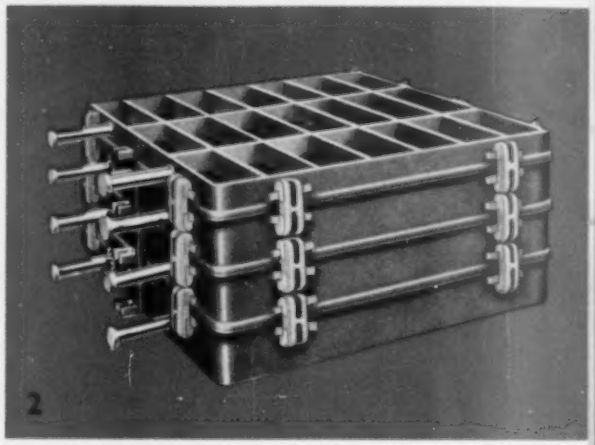
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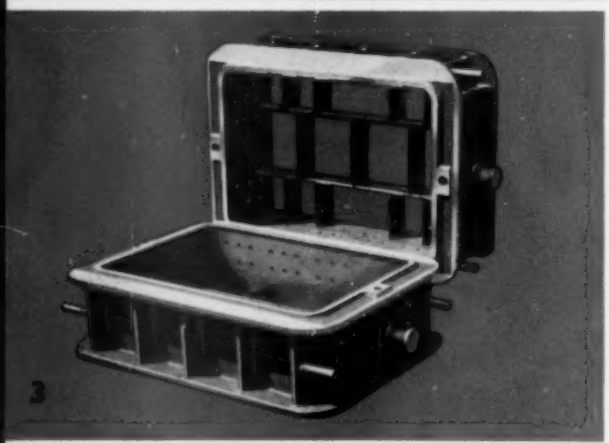
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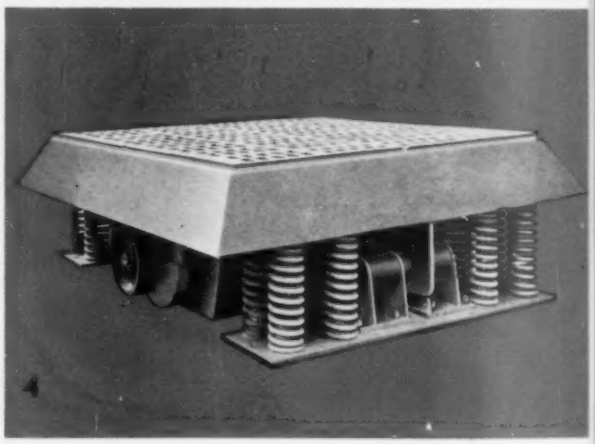
4

1. Shows a typical box made from our special hot rolled section with solid flanges and solid centre reinforcing rib. Combines lightness with strength, durability and rigidity.

2. A 4 parted box with bars, heavy handles for crane or manual lifting, and clamping bars with clamps.

3. Suitable for use on semi-automatic plants. Wide flanges give great strength—machined flange edges provide accurate location against stops.

4. A typical 2 bearing Shake-out machine available to capacity of 25 tons and 96" × 144" grid.

**Sterling**
**MOULDING BOXES**

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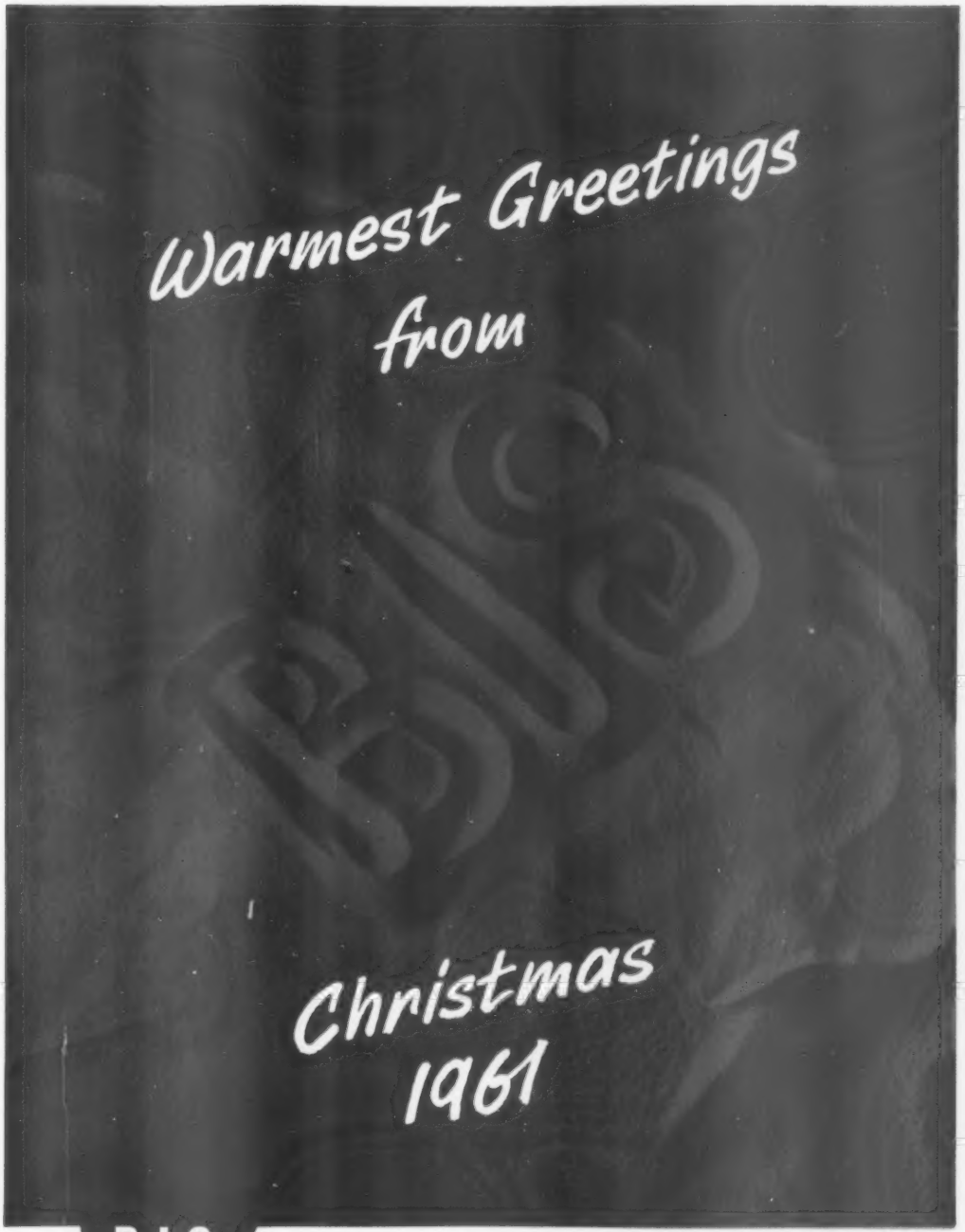


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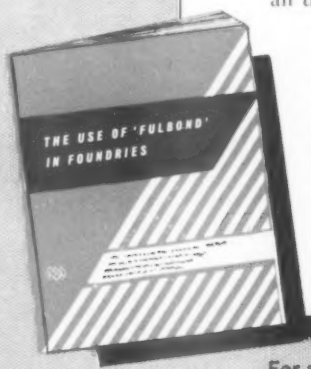


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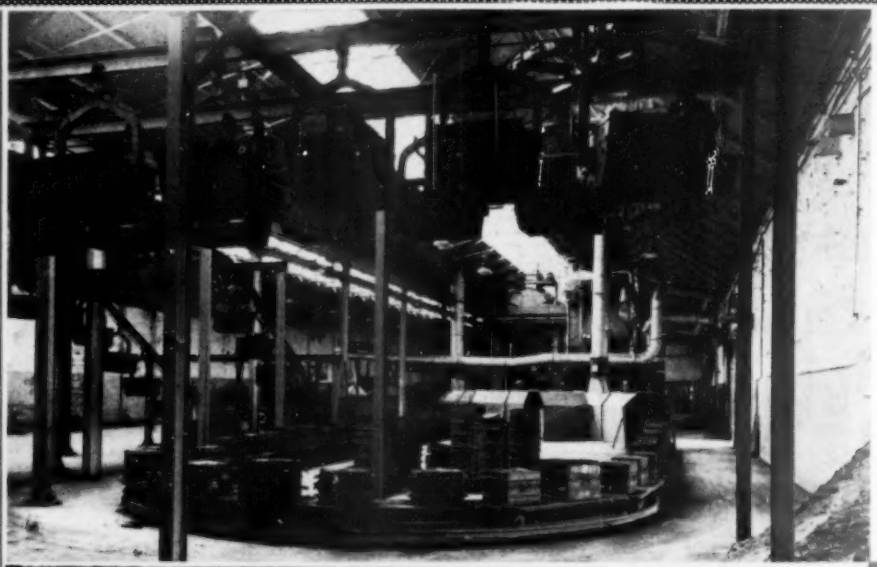

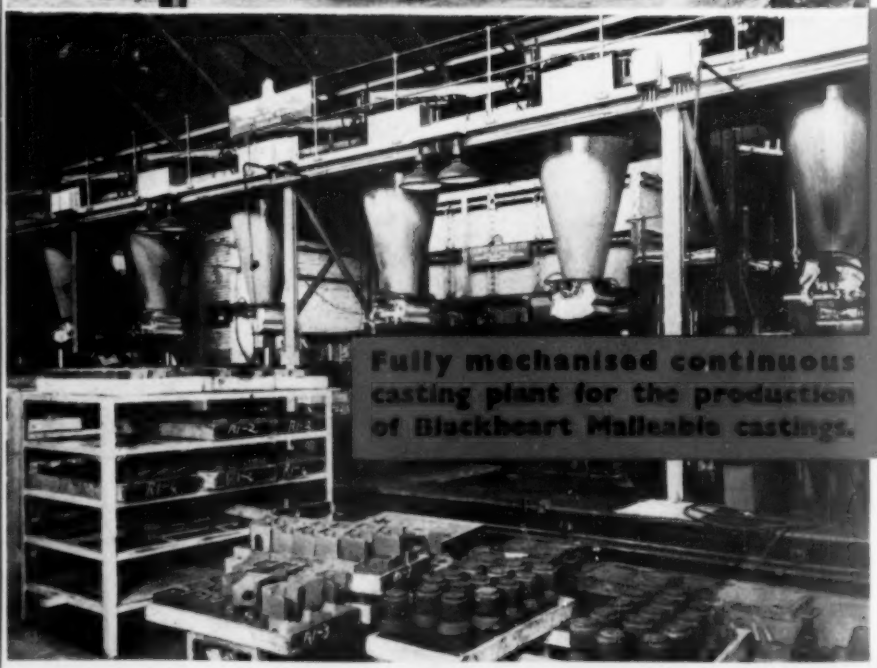

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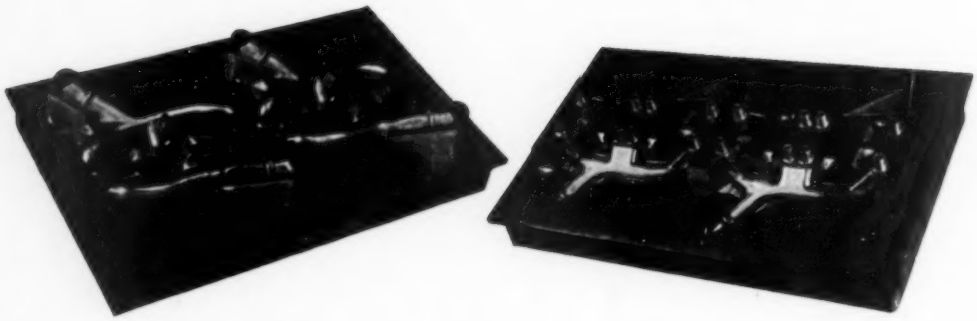

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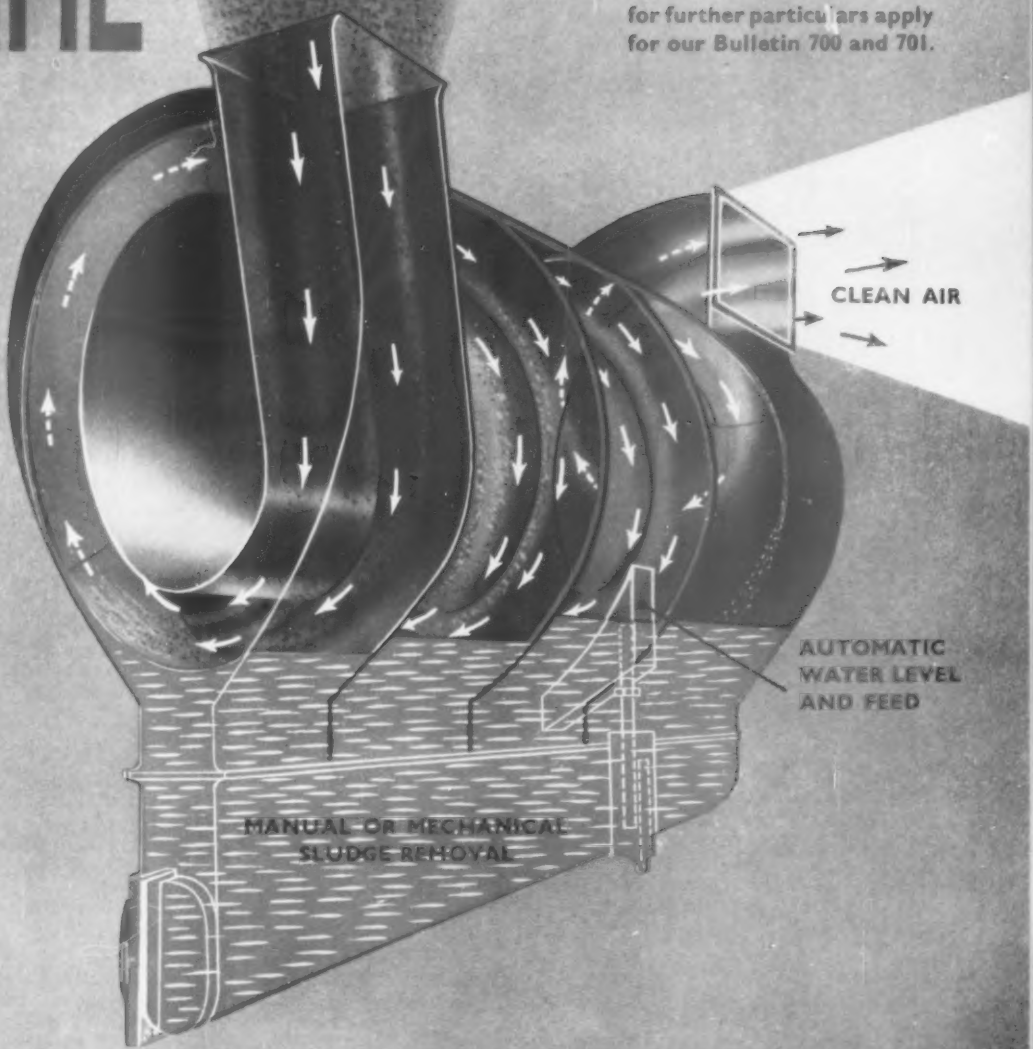


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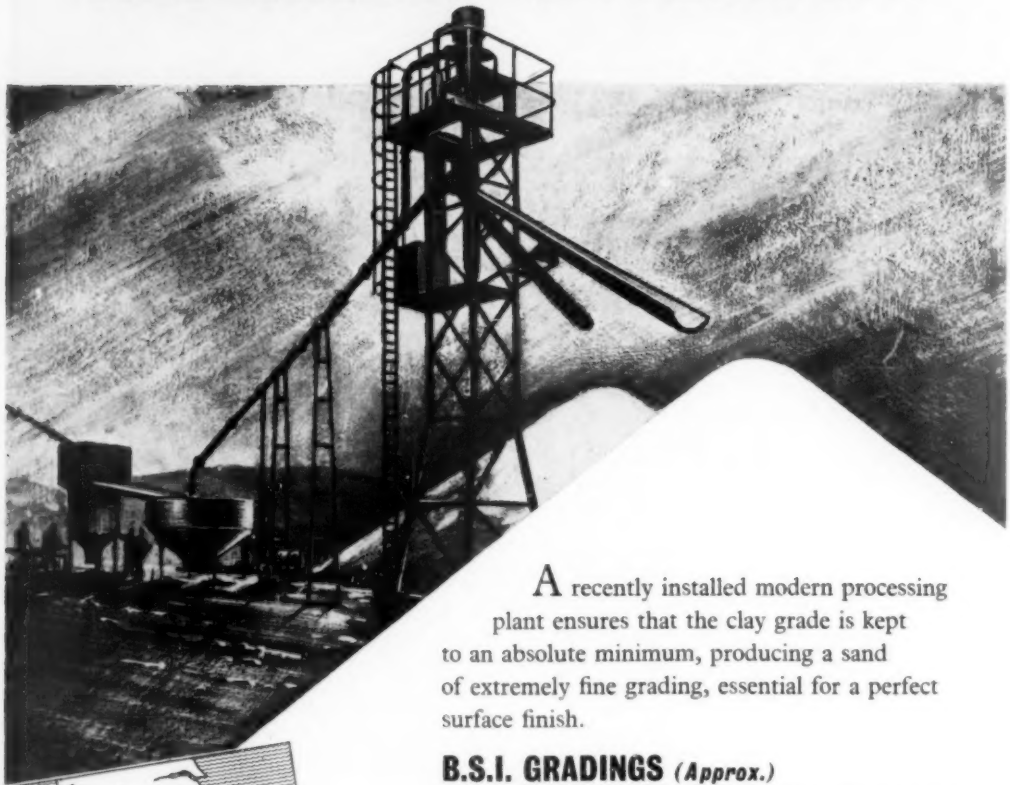

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# FOUNDRY TRADE JOURNAL

Vol. 111 December 21, 1961 No. 2350

Established 1902

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Published each Thursday

*Annual subscription:* *United Kingdom* 52*s.*
*Abroad* 60*s.* *Payable in advance*

*Editorial Director:*
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*The FOUNDRY TRADE JOURNAL is the official organ of the British Steel Founders' Association; Association of Bronze & Brass Founders; the Light Metal Founders Association; Foundry Trades' Equipment & Supplies Association; and the National Society of Master Patternmakers.*

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# Christmas Greetings..

**To all our Friends in the Foundry Trades we send Hearty Greetings for the Festive Season, and Best Wishes for Health, Happiness and Prosperity in the coming Year.**

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FOUNDRY
TRADE JOURNAL

Vol. 111 December 21, 1961 No. 2350

# Foundry Industry and the Common Market

We are constantly being asked how the entry of Great Britain into the Common Market would affect the foundry industry. Because the foundry industry caters for all others, any benefit to this country would be reflected in increased activity amongst manufacturers of cast products. As for individual concerns, however, they must find their answers by referring to their customers. The iron and steel industry, through their spokesman, Mr. T. R. Wheeler, has stated that from their customers they ought to receive increased business, but there is likely to be little change in their direct exports or imports. This, then, is a general picture of the probable impact on the foundry industry.

It appears wise, however, to examine some of the major industries which buy vast quantities of castings, for this should reveal trends in export potentials. Starting with the British automobile industry, we believe that they can look for increased exports. They are, in general, well equipped and managed and already possess good experience both of exports and the institution of after-sales services, but the latter will have to be considerably extended. Next to be considered are the UK State-monopoly industries—coal, gas, electricity, etc., —whose castings needs are many and various. They are catered for by a large group of British founders, but some of these are not so very well placed to extend similar services to the " Six," as they are bogged down by specifications and designs peculiar to this country. Moreover, Continental founders are better able to cater for their local needs in this field, so that for UK suppliers to obtain contracts in such cases would indeed be a severe test of salesmanship. Even for such items as electrical junction-boxes, which are mass-produced economically in this country and find a ready sale in the Dominions, it would be hardgoing to break into the Western European market. Another large outlet for castings is the engineering industry, including machine-tool producers. Here, prospects in Europe are considered to be good. The supply of valves is already an international activity of some importance and once more a free market should help, as again the British industry is highly efficient. Iron- and steel-works castings, such as ingot moulds, slag ladles and the like, are already being exported in large quantities and there would be more reason to expect expansion rather than diminution. Castings in hardware, providing their British users can cater for Continental tastes with their finished goods, should be able to reach exports markets especially if the firms concerned participate in " British Weeks " organized from time to time in Continental stores. So far as heating and cooking stoves, baths and the like are concerned, only the very latest designs would find a market, as each individual country has its own suppliers for traditional types. Wood-burning stoves, for example, we should imagine, will never be mass-produced in this country. Nevertheless, we do feel that some of the newer designs of baths should find a market in countries where the spending power of the masses is relatively high.

This last remark is the keynote of Common Market business, as year by year, standards of living are reaching even higher levels. With this comes a desire for prestige commodities which Great Britain is historically very often in a position to supply. A large measure of goodwill has been built up surrounding the quality of British woollen, food, sports equipment and other goods and the machinery used in these industries incorporates a vast quantity of foundry products. It follows that it is a general increase in the level of business at which founders would need to look for major benefits to their industry following UK entry into the Common Market.

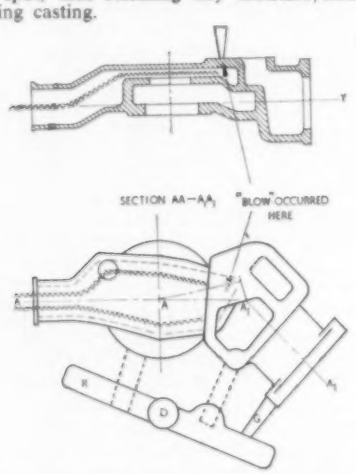
# Correspondence

*To the Editor of the* FOUNDRY TRADE JOURNAL

## LEAKING WATER-PUMP CASTINGS*

SIR,—The casting illustrated under this heading in the JOURNAL of November 30, p. 682, is obviously giving trouble because of the accumulation of gas from the top core. This can arise through lack of venting or also through insufficient drying of the core—a core made up of oil-sand should be thoroughly baked, thus driving out much of the gas from the oil contained in the sand. If this is not done, the oil left will create more gas than usual and all of it will not escape, as there is metal almost completely enclosing that end of the core.

I therefore offer the following suggestions:—(1) Insert a wax vent, whilst constructing the core; or alternatively, incorporate fine ashes; (2) move the ingate to the flange making it ¼-in. deep only; (3) help to draw off the gas from the top core during pouring by igniting the vents outside the mould at the joint, and (4) insert a small riser in the cope over the trouble-spot, thus releasing any moisture/steam built up during casting.




*Elevation and plan sketches of the water-pump casting which gave trouble due to blowing at the "blind" end of the top core. Mr. Evans' modifications are shown in solid line (compare with original), the runner being extended and a new ingate at its end replacing those previously used (shown in broken line). A riser is also added.*

*Key*:—(D) Downgate (in cope), mean dia., 1 in.; (R) runner (in cope), ¾ by ¾ by 1 in. deep; (G) new ingate, ¾-in. deep (in drag), and (XY) parting-line.

I have had extensive experience of this class of work for the last 40 years and, always watching the points mentioned, have been very successful. If your correspondent follows these points correctly, he should be able to sleep at nights! The reason for his losses on some occasions and not others is to my mind the difference in behaviour between good and bad cores.—Yours, etc.,

F. EVANS, M.I.B.F.

Prittlewell, Essex.

* These are suggested remedies from readers in response to an appeal for help from an Indian foundryman who is in difficulty with "blowing" of water-pump castings. Thanks are recorded to the correspondents for their prompt and practical response.—EDITOR.

* * *

SIR,—From the plan view of the leaking water-pump, it seems pretty obvious that gas from the core during the casting operation will travel to the tip indicated, particularly due to the differential in gas pressure which must result from the design shown. Coupled to this, the section shows an "opening out" of the core which must result in greater kinetic energy at this area, with resultant "blowing" at the point shown, as no vent is incorporated in the layout described.

To cure the trouble, a capillary vent-tube could be incorporated in this core, running out through the major diameter, or a chill could be fitted over the face in question, with possibly a slight thickening of the designed thickness of the metal at this face. The end of the channel should be designed as a semi-circle in both plan and side views, if this is at all possible.

Another change which would obviate the trouble would be to design the channel in question as a trough and cast the top separately as a cover-plate. However, it is not possible to be certain of the desirability of this, unless one is in possession of more detail as to the flow, pressure, etc., when the water-pump is in use.—Yours, etc.,

N. TAYLOR.

Harlow, Essex.

* * *

SIR,—With reference to your reader's problem of leaking water-pump castings, I suggest that he tries a more adequate venting system at the trouble-spot. As can be seen from his drawing, good venting round this area is imperative, as gases in the mould are tending to rise upwards towards the area—the uppermost part of the mould.

Particularly with greensand work, very close attention must be paid to the removal of the gases from moulds as quickly as possible. Therefore, I would stress the importance of good venting with all such designs.—Yours, etc.,

J. W. SCOTT.

Windsor.

* * *

SIR,—The dimensions for this water-pump casting are not given, but if the gating system is anything like to scale then the casting is a relatively small one and the section of the core at the area where the porosity occurs will be thin. A similar trouble has been experienced in cylinder-heads for internal-combustion engines, where porosity has occurred due to gas evolution from the jacket core. As in this case, the cores are well surrounded by metal and venting through the core prints is limited.

When wax core vents are used they melt during the stoving of the core and the relatively small volume of sand becomes saturated with molten wax to a high degree. In this way a localized area of high gas-evolution potential is formed and due to the restricted venting such gas cannot escape during the period over which the iron remains sufficiently liquid during the casting operation. The result is an area of gas porosity in the casting.

It is suggested that perhaps the problem could be overcome by the use of core vents made from synthetic fibres which do not introduce any gas-forming material into the core sand. Readers will no doubt be familiar with the kind of core vent mentioned which is marketed in the form of woven tubes†.—Yours, etc.,

for Foseco International, Limited,
J. L. FRANCIS,
*Senior Metallurgist, Information Department.*

† Names and addresses of suppliers of this material can be quoted if required—EDITOR.

# Foundry Practice and Patternmaking Courses at Poplar Technical College

**Recently in the JOURNAL*, details were included of foundry and patternmaking courses available to students and apprentices in the Glasgow area. Supplementing the earlier account, what follows is a summary of procedures, curricula and courses available at Poplar Technical College—one of the most successful London colleges. Results from last year's courses have been reported in the JOURNAL† and we would remind readers that noteworthy among these was the achievement of eight Extra First-class (Marine) Certificates out of fifteen made throughout the whole of the UK and Commonwealth; at the same time seven students obtained first-class passes at advanced level at the City and Guilds "final" in Foundry Practice and also in Patternmaking.**

Poplar Technical College, which comes under the jurisdiction of London County Council, was formerly known as the School of Engineering and Navigation. It is now primarily a college for engineering subjects only and at the present time has three main departments concerned with mechanical, electrical and marine engineering, catering for full-time, part-time, day-release and evening students. It is situated in the dockland area of London and hence has strong associations with marine engineering in all its aspects. It is also in relatively close proximity to the Dagenham works of the Ford Motor Company, Limited, and receives many students from that organization.

Courses for foundry practice and patternmaking have been in operation at the College since 1923, except for the war period, and at present consist of part-time day and evening classes. These provide four years' study to the advanced level examination of the City and Guilds Institute for both trades. The appropriate syllabuses are followed throughout but, where necessary, efforts are made in their interpretation so as to meet special requirements of students or to satisfy their firm's requests. Specialized short courses in foundry technology are also provided.

### Part-time Day Courses

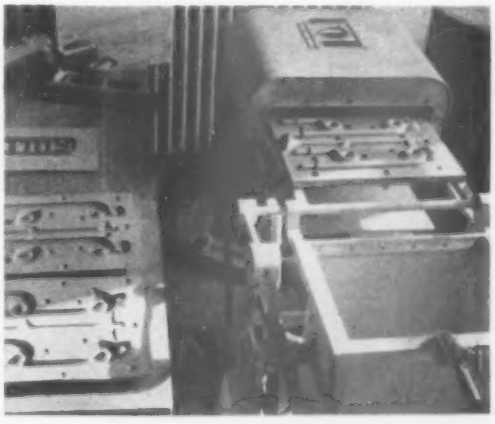
The part-time day courses in foundry practice and patternmaking are attended mainly by apprentices and journeymen. The more advanced stages have been found to be of benefit to foundry technicians and other personnel. Each year of the part-time day courses is separate so that there is no combination of classes of students at different stages. Attendance is for one day and one evening each week, a different day being allotted for each grade. The day-time organization is such that the foundry classes are separated from the patternmaking classes for technology and drawing studies but are generally combined for the subjects of "calculations," "general science" and "English." This latter arrangement assists with staffing and provides a good opportunity for students of the separate trades to establish contact and get to know each other. The classes again separate for the evening activities which are confined to practical work in the college foundry or patternshop. Evening classes cater for the more-adult students who are required to attend for three evenings per week.

For all students, promotion from one grade to the next is by written examination. First- and third-year students are submitted to internal examinations set by the College, whilst the second-year students must gain a pass in the City and Guilds of London Institute "Ordinary"-grade examination before proceeding to the third year. The internal examination consists of one paper in each of the subjects studied and a practical test and a pass in each is essential before promotion can be granted.

### Practical Foundrywork

Practical work in the foundry is organized to follow closely the technological instruction given

FIG. 1.—*Shell-moulding machine used for the instruction of first- and second-year students at Poplar Technical College.*



* September 21, p. 347.
† March 16, p. 340.

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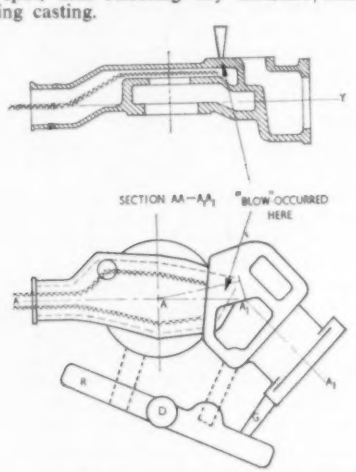


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F. EVANS, M.I.B.F.

Prittlewell, Essex.

* These are suggested remedies from readers in response to an appeal for help from an Indian foundryman who is in difficulty with "blowing" of water-pump castings. Thanks are recorded to the correspondents for their prompt and practical response.—EDITOR.

* * *

SIR,—From the plan view of the leaking water-pump, it seems pretty obvious that gas from the core during the casting operation will travel to the tip indicated, particularly due to the differential in gas pressure which must result from the design shown. Coupled to this, the section shows an "opening out" of the core which must result in greater kinetic energy at this area, with resultant "blowing" at the point shown, as no vent is incorporated in the layout described.

To cure the trouble, a capillary vent-tube could be incorporated in this core, running out through the major diameter, or a chill could be fitted over the face in question, with possibly a slight thickening of the designed thickness of the metal at this face. The end of the channel should be designed as a semi-circle in both plan and side views, if this is at all possible.

Another change which would obviate the trouble would be to design the channel in question as a trough and cast the top separately as a cover-plate. However, it is not possible to be certain of the desirability of this, unless one is in possession of more detail as to the flow, pressure, etc., when the water-pump is in use.—Yours, etc.,

N. TAYLOR.

Harlow, Essex.

* * *

SIR,—With reference to your reader's problem of leaking water-pump castings, I suggest that he tries a more adequate venting system at the trouble-spot. As can be seen from his drawing, good venting round this area is imperative, as gases in the mould are tending to rise upwards towards the area—the uppermost part of the mould.

Particularly with greensand work, very close attention must be paid to the removal of the gases from moulds as quickly as possible. Therefore, I would stress the importance of good venting with all such designs.—Yours, etc.,

J. W. SCOTT.

Windsor.

* * *

SIR,—The dimensions for this water-pump casting are not given, but if the gating system is anything like to scale then the casting is a relatively small one and the section of the core at the area where the porosity occurs will be thin. A similar trouble has been experienced in cylinder-heads for internal-combustion engines, where porosity has occurred due to gas evolution from the jacket core. As in this case, the cores are well surrounded by metal and venting through the core prints is limited.

When wax core vents are used they melt during the stoving of the core and the relatively small volume of sand becomes saturated with molten wax to a high degree. In this way a localized area of high gas-evolution potential is formed and due to the restricted venting such gas cannot escape during the period over which the iron remains sufficiently liquid during the casting operation. The result is an area of gas porosity in the casting.

It is suggested that perhaps the problem could be overcome by the use of core vents made from synthetic fibres which do not introduce any gas-forming material into the core sand. Readers will no doubt be familiar with the kind of core vent mentioned which is marketed in the form of woven tubes†.—Yours, etc.,

for Foseco International, Limited,
J. L. FRANCIS,
*Senior Metallurgist, Information Department.*

† Names and addresses of suppliers of this material can be quoted if required—EDITOR.

# Foundry Practice and Patternmaking Courses at Poplar Technical College

**Recently in the JOURNAL*, details were included of foundry and patternmaking courses available to students and apprentices in the Glasgow area. Supplementing the earlier account, what follows is a summary of procedures, curricula and courses available at Poplar Technical College—one of the most successful London colleges. Results from last year's courses have been reported in the JOURNAL† and we would remind readers that noteworthy among these was the achievement of eight Extra First-class (Marine) Certificates out of fifteen made throughout the whole of the UK and Commonwealth; at the same time seven students obtained first-class passes at advanced level at the City and Guilds "final" in Foundry Practice and also in Patternmaking.**

Poplar Technical College, which comes under the jurisdiction of London County Council, was formerly known as the School of Engineering and Navigation. It is now primarily a college for engineering subjects only and at the present time has three main departments concerned with mechanical, electrical and marine engineering, catering for full-time, part-time, day-release and evening students. It is situated in the dockland area of London and hence has strong associations with marine engineering in all its aspects. It is also in relatively close proximity to the Dagenham works of the Ford Motor Company, Limited, and receives many students from that organization.

Courses for foundry practice and patternmaking have been in operation at the College since 1923, except for the war period, and at present consist of part-time day and evening classes. These provide four years' study to the advanced level examination of the City and Guilds Institute for both trades. The appropriate syllabuses are followed throughout but, where necessary, efforts are made in their interpretation so as to meet special requirements of students or to satisfy their firm's requests. Specialized short courses in foundry technology are also provided.

### Part-time Day Courses

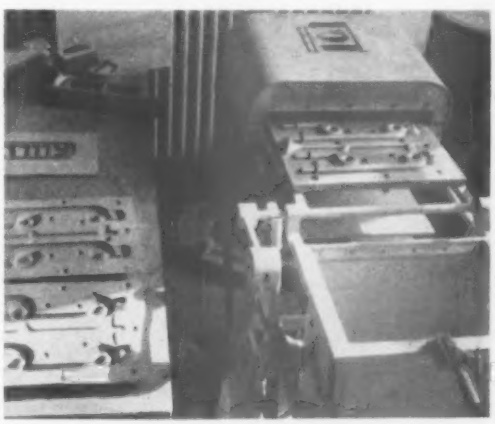
The part-time day courses in foundry practice and patternmaking are attended mainly by apprentices and journeymen. The more advanced stages have been found to be of benefit to foundry technicians and other personnel. Each year of the part-time day courses is separate so that there is no combination of classes of students at different stages. Attendance is for one day and one evening each week, a different day being allotted for each grade. The day-time organization is such that the foundry classes are separated from the patternmaking classes for technology and drawing studies but are generally combined for the subjects of "calculations," "general science" and "English." This latter arrangement assists with staffing and provides a good opportunity for students of the separate trades to establish contact and get to know each other. The classes again separate for the evening activities which are confined to practical work in the college foundry or patternshop. Evening classes cater for the more-adult students who are required to attend for three evenings per week.

For all students, promotion from one grade to the next is by written examination. First- and third-year students are submitted to internal examinations set by the College, whilst the second-year students must gain a pass in the City and Guilds of London Institute "Ordinary"-grade examination before proceeding to the third year. The internal examination consists of one paper in each of the subjects studied and a practical test and a pass in each is essential before promotion can be granted.

### Practical Foundrywork

Practical work in the foundry is organized to follow closely the technological instruction given

FIG. 1.—*Shell-moulding machine used for the instruction of first- and second-year students at Poplar Technical College.*



* September 21, p. 347.
† March 16, p. 340.

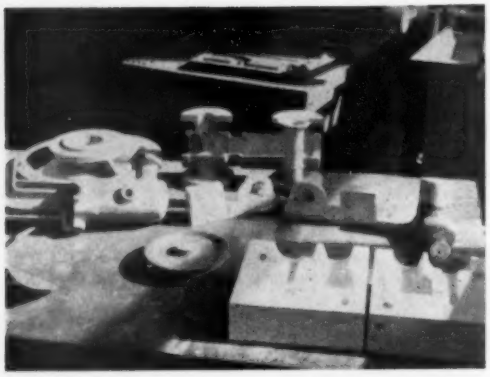


FIG. 2.—*Cope and drag parts of a $CO_2$ mould with a number of non-ferrous castings made by the students.*

in the classroom. First- and second-year students practice many aspects of mould and coremaking, including shell moulding (Figs. 1 and 2) and $CO_2$ work. As the classwork develops, practical instruction is given in furnace operation. Towards the end of the second year, the students carry out simple experiments in sand testing, feeding and gating techniques. The third- and fourth-year students proceed to the more-difficult aspects of moulding and coremaking (see Fig. 3) and study and practice various melting and pouring techniques, including control of melting and pouring temperatures and nitrogen degasification (Fig. 4) for non-ferrous melts.

During the final year the practical work assumes a strong experimental bias. Results of experiments with the use of various fluxes, mould coatings

FIG. 3.—*An anxious moment in the production of a cup, saucer and spoon mould made by more advanced students at Poplar Technical College.*

and core oils, etc., are analysed. Experiments are conducted on the solidification of alloys and to establish optimum feeding conditions. On completion of each experiment, the student is required to submit a written report, including graphical records of numerical data with conclusions drawn. Advanced students use the "strength of materials" laboratory and conduct experiments for all the normal British Standards tests. Polishing, etching

FIG. 4.—*Nitrogen degasification of a Si/Al alloy in the foundry department of the College.*

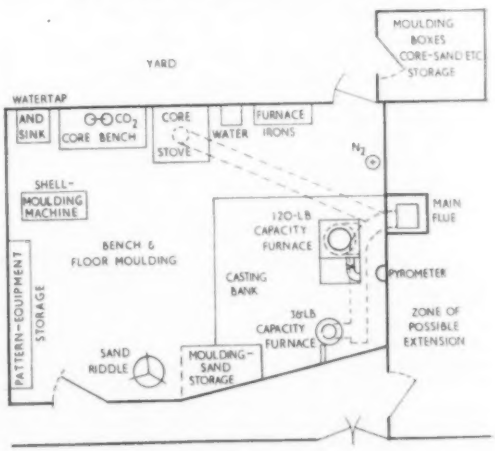



FIG. 5.—*Plan of the existing foundry showing the layout of the varied facilities designed to span a wide range of foundry practice rather than one process in detail.*

and micro-examination of cast alloy specimens is also a part of this work. Written correlation of all results obtained in this laboratory is expected.

The foundry (Fig. 5) is planned essentially for qualitative rather than quantitative work and hence is equipped to demonstrate a range of fundamental processes rather than to specialize in any one aspect of casting production. A sizeable extension to the present foundry is envisaged for the near future making a greater range of furnaces and equipment available for students' use.

troduced at various stages and used after the appropriate instruction, strict supervision being at all times maintained. Patterns, both strickled and cast in plaster-of-Paris, are prepared during these years and also experience of a simple character is given in the application of cast and laminated synthetic-resin techniques. Metal pattern work can be catered for by including the students in the practical machine-shop classes, the patternmaking technology, drawing

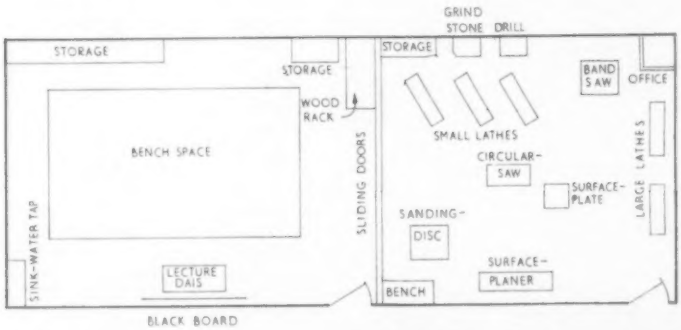



FIG. 6.—*Plan of the patternshop shared by students taking foundry-technician and patternmaking courses.*

and ancillary subjects being provided for in the normal daytime classes.

Generally, practice is given

**Patternshop Schemes**

The patternshop (Figs. 6 and 7) has adequate facilities for the preparation of wood pattern equipment and, as for the foundry, the practical work follows classroom instruction closely. First- and second-year students prepare examples of

FIG. 7.—*Group of students engaged on bench work in the patternshop depicted in Fig. 6.*

patternwork which are carefully selected and graded to provide practice in a wide variety of tooling operations, the emphasis being on hand-tool work in the early years. The third- and fourth-year students tackle work of increasing geometrical complexity demanding the use of the layout board in the plotting and transfer of points. Machine-tools (Fig. 8) are in-

FIG. 8.—*Students using three of the machine-tools that may be seen sketched in plan view in Fig. 6. In the foreground is the circular saw, on the left, the surface planer, and at the back the sanding disc.*

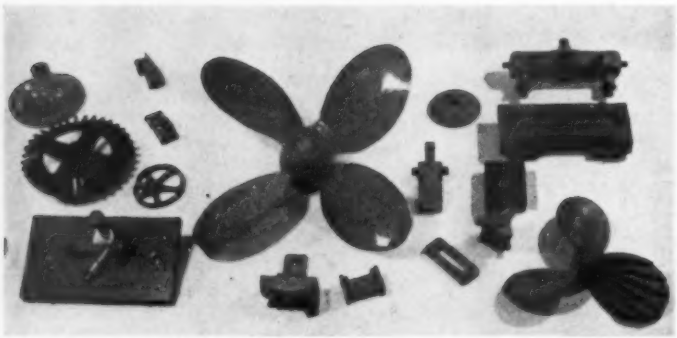


FIG. 9.—*Varied group of intricate and precision wooden-patterns made in the pattern-shop at Poplar Technical College.*

in all classes of wood pattern equipment, from loam strickles and skeleton patterns to precision, high-quality hardwood patterns (Fig. 9) and, where possible, arrangements are made for patternmakers to cast from their patterns in order to check mouldability, core location, metal thickness, etc. In all the practical classes, experience in the College foundry is available, for the patternmakers and foundry students are encouraged to take an active interest in the preparation of pattern equipment.

### Summer Course

In addition to the normal courses detailed above, the College programme includes a short full-time summer course of two weeks duration in foundry practice. This course is arranged specifically for young engineering draughtsmen in order that the foundry experience gained will be of assistance in the suitable design of casting shapes in relation to manufacture, and has operated annually for some five to six years, with increasing development. Recently a short course, consisting of six lectures, was organized covering the latest technological aspects of feeding and gating systems, which past students of the College and other foundry technicians were invited to attend. Discussions at the conclusion of these lectures gave rise to the idea that similar lectures on specific aspects of foundry technology would be of great assistance to busy foundry technicians who must keep abreast with up-to-date trends and developments and it was suggested that further lectures should be arranged.

A post-City-and-Guilds practical course is available to patternmakers who are in possession of suitable qualifications and who wish to gain experience in work of a specialised character, such as gearing or ship-propeller manufacture.

The College staff is also very much concerned in maintaining personal contact with industry and welcome the opportunity to discuss technical problems, aspects of courses and students' progress with all concerned.

## *Book Review*

**Control of Airborne Dust,** by W. D. Bamford, A.M.I.E.E. Published by the British Cast Iron Research Association, Alvechurch, Birmingham; price £4 4s. ($12) or £3 5s. to members of the Association.

This is a sizeable book of 475 pages, of which 315 are text and the remainder given over to appendices. These latter undoubtedly enhance the publication's value as a textbook, as without them, a whole library would be necessary when calculations were needed. An excellent feature of the book, however, is the manner in which the author has restricted mathematics to the bare essentials. It is said that it is always the first chapter of a book which is the most difficult to write, but in this case, instead of being as "dry as dust," it is alike interesting and informative, dealing, as it does, with the formation and dispersal of dust and fumes, thereby disclosing the fundamental problems to be solved if foundries are to be made not merely *respectable*, but *respected* places in which to work.

The author has used 15 chapters to cover the whole field of work carried out by the British Cast Iron Research Association during the last decade or so. Many of the chapters are of common interest to foundry executives and manufacturers of the plant they instal. Such subjects as the design of side-, down- and top-draught exhaust systems have been—and still are—widely discussed in foundry managers' offices in a search for the most effective plant for a specific set of conditions. In general, the reviewer has found more installations of the down-draught system, perhaps because it is less affected by cross currents than the side-draught. Unfortunately, however, because hot gases tend to rise, it would seem to be the least efficient of the various systems.

Chapter 9 of the book, covering the subject of sand-cooling and dust control, whilst giving half-a-dozen recommendations on designs of sand screens, is in the main devoted to means of procuring essential data for making further progress. This is followed by a chapter on the control of dust-bearing air-currents from abrasive wheels and non-foundry and overseas readers can be assured that this is a topic which was pioneered by British foundry research organisations and it is to these bodies and these only that they can turn for original and authentic information. The concluding chapters are also not specifically "foundry," but deal with general questions of heating and ventilating of shops where manufacturing processes are undertaken.

Whilst the foundry industry will receive major benefit from the reading of this book, many other industries can turn to it for guidance in their search for the provision of better and safer working conditions. The book certainly must be given space in every foundry manager's bookshelf.

V. C. FAULKNER.

# Abrasive Testing . . .
## . . . a Critical Evaluation

*By O. F. Mayer**

**Abrasives are used as working media in a multitude of blasting processes. Since they wear and must be replaced the economy of their application is a matter of interest to the user. This article compares a number of proposed and partly-used testing methods for determining the breakdown properties of abrasives.**

Abrasives are used for cleaning the most diverse components, for instance castings from sand, mill products from scale etc.; or for treating their surfaces, as in peening or etching. According to the application, metal, mineral or organic abrasives may be used. Among the metal abrasives—both cast and wrought—the ferrous type predominate, but light-metal and other non-ferrous abrasives are also known to be used. Abrasives are supplied in many nominal sizes in the range of about 0.1 mm. to 3 mm. Traditionally the various abrasive producers supply to their individual specifications, except where acknowledged standards exist, as in the US (SAE Recommended Practices for Cast Shot and Grit, and Cut-wire Shot), in Great Britain (Chilled-iron Shot and Grit, BS 2451 : 1954) and Switzerland (Metallische Strahlmittel, VSM 37501, now being issued). A wide variety of different machines exists for blasting parts with abrasive and depending on the application, the abrasive is propelled either mechanically or by air. Abrasive consumers are—or should be—interested in applying the most economical abrasive, that is an abrasive which combines the highest effect with the lowest breakdown. Effect and breakdown may, however, be inversely related and a compromise may have to be aimed at. While the blasting effect can be determined quickly, the measurement of breakdown or consumption in a production machine is a lengthy procedure, extending over weeks and even months. It is understandable, therefore, that abrasive consumers would like to have a faster method for arriving at the breakdown, and consumption figures for a particular abrasive. They may merely want to ascertain that their abrasive supplier keeps consecutive deliveries within certain quality limits or they may also wish to compare two or more makes of abrasive with regard to their breakdown properties in a production machine.

### Problem

The abrasive particle or pellet works and is destroyed by repeated impact and by abrasion. Conditions of impact vary widely however; in one case the impact may be cushioned by sand to be removed from the surfaces of an irregularly-shaped casting; in another case the pellets may rebound from the flat surface of a steelplate to be descaled. The impact-speed affects abrasive breakdown to a high degree and doubling speed means approximately four times higher breakdown; impact-angle and target-hardness influence it likewise. In a production machine the comminuted abrasive is removed together with contaminants like sand, scale, etc., by a separator. The separation size is, or should be, adapted to a given blasting operation. Depending on the separation size—or cut—selected, more, or less abrasive is removed from circulation and must be replaced. Apart from this controlled removal of undersized abrasive, losses may occur through carry-out with the blasted parts. It is obviously difficult, therefore, to produce testing conditions which are representative of actual production conditions. If an abrasive must be tested for acceptance—is to be checked-in, so to speak—it seems entirely possible to create arbitrarily testing conditions, as close to practice as necessary. If, however, the consumer wants to compare different abrasives by testing their effectiveness and breakdown with a view to their use in a production machine, he *must* simulate service conditions or else his comparison will be misleading. Static tests, like hardness measurement and metallographic tests are not therefore considered here.

### Testing Equipment

A number of different types of testing equipment are available, or at least known, which are more or less versatile. The simulation of conditions prevailing in a production machine must be kept in mind when comparing this equipment.

The earliest apparatus for testing abrasives seems to have been a drop-weight instrument originating in the UK. It was obviously intended for testing only chilled-iron abrasives. The brittle abrasive, spread on an anvil, was partly crushed by the impact of the drop weight and some conclusions were drawn from the degree of comminution obtained. In view of the disparity between testing and operating conditions usually prevailing, it will suffice simply to acknowledge this apparatus as the ancestor of newer testing equipment, which has superseded it. A testing machine reminiscent of a hammer-mill originated in the US. A triangular rotor turns at high-speed in a narrow, counter-rotating, internally serrated housing. A small sample of abrasive is placed in the housing and tested until a certain portion passes a selected screen. The stresses to which the individual pellets are subjected do not quite correspond to practice. The number of impacts as well as the magnitude of impacts which

* The Author is on a Swiss foundry sub-committee dealing with abrasive standards.

*Critical Evaluation of Abrasive Testing*

each pellet receives are uncontrollable and in addition some direct grinding action takes place. Another American testing machine has a rotating head with two beaters, a co-axially and slowly-rotating circular anvil casing with a circulating device, and has a dust collector. This machine reproduces the impact conditions prevailing in practice to a fairly-high degree. With two other American testing machines a bladed rotor turns in a stationary housing, equipped in one case with a smooth impact ring, and in the other with a serrated impact ring. A Swiss testing machine embodying the same principle, has a number of adjustable and exchangeable impact plates and an abrasive re-cycling device; a dust collector is also part of the unit. These three last-mentioned machines approximate to practical operating conditions—within the limits permitted by the size of a laboratory machine—and lend themselves to diverse testing methods.

## Methods of Test

An abrasive user may wish to determine blasting effect and/or abrasive breakdown by a laboratory test.

*Blasting Effect*

Blasting effect is sometimes determined by measuring the cutting action of abrasive on a mild-steel plate, by its relationship to the loss of weight due to abrasion. It is evident that this method is hardly representative because very seldom is metal removal the purpose of a blasting operation. Measuring the cutting rate may on the contrary be misleading when in practice useful work is essentially performed by impact. For shot-peening applications the so called Almentest is used, which consists in blasting a small specimen plate on one side and measuring the ensuing deformation. The depth of indentation is measured in cases where the etching of a surface is the purpose of a blasting operation. Since the determination of blasting effect in a production machine is probably less time-consuming than in a testing machine, if conditions are to be simulated, and on the other hand gives more reliable results than a laboratory test, the latter should be approached with caution.

*Abrasive Breakdown*

This is the result of repeated impact. In a production machine the comminuted abrasive is removed when—due to its size—it is no longer considered capable of performing useful work. The abrasive consumer is therefore interested in knowing how many times a given abrasive can be subjected to impact before it breaks down to removal size, or in other words, how much of a given new abrasive he must add per cycle or hour to balance the loss due to removal of undersized abrasive. Two basic testing methods are known as the stabilized-loss test and the total breakdown test.

*Stabilized-loss Test.*—This method reproduces as nearly as possible the conditions in a production machine. The abrasive removed from circulation by exhaust or deliberately by screening (simulating the separation in production machine) is replaced continuously or in regular intervals by new abrasive. The test is continued until the abrasive mixture in the machine becomes stabilized,

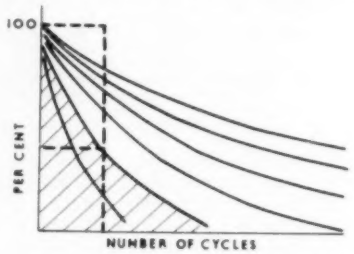



FIG. 1.—*Curves relating the number of shotblasting cycles to the residual quantities of shot passing various sized screens. The progressive disintegration of the medium—in this instance chilled-iron shot—is demonstrated and the shaded portion indicates average life. (The area in dotted outline is the rectangular equivalent of this zone.)*

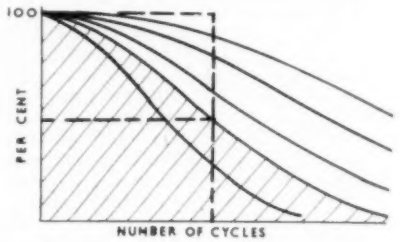



FIG. 2.—*Similar breakdown curves as in Fig. 1, but in this instance for cast-steel shot.*

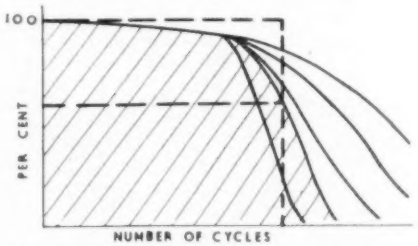



FIG. 3.—*Breakdown curves with cut steel-wire shot as the medium.*

that is, until the particle-size distribution remains the same. At this stage the addition of new abrasive per cycle is constant and this constant quantity—expressed as a percentage of the total sample—can be taken as characteristic of the tested abrasive. From this characteristic it is possible to calculate the abrasive consumption in a production machine, provided of course that the testing machine has previously been adjusted

to the prevailing production conditions. The stabilized-loss test can be used for comparing different abrasives and for acceptance testing if the time required for the test—possibly quite long—is no obstacle.

*Total-breakdown Test.*—In this test an abrasive sample of given weight is repeatedly passed through the testing machine while being removed in regular intervals for size analysis, until the whole sample passes the smallest-size screen used. This test yields a breakdown curve for each screen

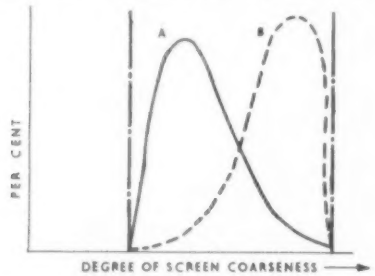



FIG. 4.—*Graph demonstrating shot particle-distribution size of two samples both meeting size specification but leading to anomalous results in the K-50 testing method, arising from the presence in one sample of a larger fraction of above-nominal sized particles. Curve A represents the low-limit, nominal and reference screen; and B, the high-limit screen. The curves are illustrative and do not relate to actual values.*

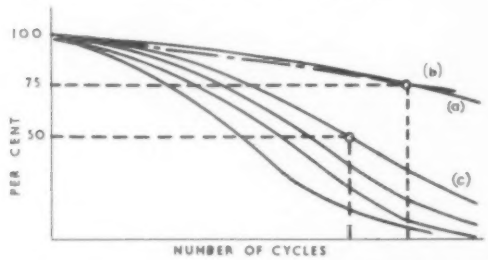



FIG. 5.—*Breakdown curves for the sample-weighing method. (a) Is the actual breakdown curve for 0.07 mm. removal size, (b) the substituted straight line, and (c) the breakdown curve for 0.3 mm. removal size.*

size (corresponding to removal size in production machine) selected. To obtain the curve the cumulative percentage of the sample retained on a given screen is plotted against the pertinent—and measured—number of impacts or cycles through the testing machine. Depending on the type of abrasive, the breakdown curves follow a different course.[1, 2] Fig. 1 gives an example of breakdown curves for chilled-iron shot, Fig. 2 for cast-steel shot and Fig. 3 for cut steel-wire shot. The area—expressed in units: 1 per cent. by 1 cycle—under each curve represents the useful, or average, life of the tested abrasive sample relative to the removal size, respective reference screen selected and under the prevailing testing conditions. The number of cycles pertaining to the average life of an abrasive is obtained by dividing the area by 100 (in consistent units).

A comparison of the breakdown properties of different abrasives in respect of their use in a production machine can be made on the basis of average life, provided the removal size of the production machine is known and provided that the testing machine has been so adjusted as to give average-life figures which correspond to the average-life figures obtained in that production machine. Before making such a comparison it is therefore necessary to measure the abrasive consumption in the production machine for one of the abrasives in question. This is a somewhat lengthy procedure but it must be carried out in order to ascertain dependable results. It is obvious that if a comparison has been made for a foundry shotblasting machine it is not necessarily valid for a shotblasting machine descaling steel plate.

*Acceptance Test.*—For making such a test of a given abrasive, the above procedure may be simplified, taking advantage of the fact that average life is approximately reached when between 45 and 60 per cent. of the tested sample passes through the reference screen.[1, 2] This reference screen should be of sufficiently smaller size than the nominal-size screen in order to eliminate the influence of initial particle-size distribution. It should not be so small as to extend the test unduly. The SAE manual on blast cleaning mentions a reference screen of 0.0117 in. for nominal abrasive sizes of 0.023 in. and above, and of 0.0049 in. for nominal abrasive sizes below 0.023 in. The impact speed may be chosen to correspond to the highest impact speed met in a production machine, for instance 262 ft. per second.

*K-50 Method.*—An extreme case of abbreviated test—the least suitable of several variants proposed[3] is being—or at least has been—practised to a certain extent under the name K-50 method. A comparatively-large abrasive sample is run through the tester until about 50 per cent. of the abrasive remaining in the testing machine passes the nominal-size screen (actually 50 per cent. of that portion of the abrasive sample, which was initially retained on the nominal-size screen). The choice of the nominal-size screen as reference screen means that the initial particle-size distribution above the nominal size considerably influences the result of the test, termed K-50 value. Fig. 4 shows that an abrasive may meet size specifications but have, *in extremis*, a size distribution indicated by curves A and B. It is obvious that fewer impacts are required to reduce abrasive A to below nominal size than abrasive B, though both have identical quality. The second, also considerable error was introduced by ignoring that portion of the original abrasive sample, which had been removed from circulation by the exhaust in the course of the test. This test is unsuitable for any

*Critical Evaluation of Abrasive Testing*

purpose because the results are highly misleading.

*Sample Weighing.*—Another abbreviated test eliminates all screening during the test and depends entirely on weighing the test sample in regular intervals; the weight of the test sample is reduced by exhaust. The removal size is extremely small with the particular testing machine used—approximately 0.07 mm. or 0.0028 in. The curve obtained is again a breakdown curve, due to the small removal size it approximates more or less a straight line (Fig. 5). For the purpose of interpretation a straight line is substituted and the test is discontinued when the original sample weight has dropped by 25 per cent. This known weight reduction, divided by the number of cycles required is taken as a characteristic figure and it is suggested that abrasive consumption in a production machine may be calculated therefrom.[4] For comparing different abrasives this method should not be applied. The breakdown curves are not at all straight lines for the removal sizes of production machines. For these removal sizes —between 0.1 and 0.7 mm.—the number of cycles required for 25 per cent. of the sample to be reduced to below 0.07 mm. is not relevant. For acceptance testing this method is applicable but rather slower than the method described under heading—*Acceptance Test.*

Preferably the machine used should be equipped with a classifier which permits removal sizes corresponding to the reference screens suggested for the acceptance-test method and which works with the same accuracy as a screen. This would make sample-weighing method equivalent to the acceptance-test method for acceptance testing.

With such a machine weighing instead of screening could also be used for the total-breakdown test, but only relative to one removal size per test. For that removal size the test would be applicable for comparing different abrasives.

*Microscopical Sizing*

It has also been suggested that a test be conducted by microscopically sizing and counting the particles of a sample run through a testing machine in order to eliminate screening. The breakdown characteristic in this case is the number of cycles required for doubling the number of particles. This method is open to more measuring errors than any other method described and is too cumbersome to be of practical value. The interpretation of the results itself is very disputable.[5]

**Conclusions**

The blasting effect of an abrasive should, as a rule, not be determined by laboratory test; a possible exception is the determination of peening intensity by means of the Almen test or the measurement of surface roughness in conjunction with the stabilized-loss test. Of the test for determining abrasive breakdown the partial-breakdown test would appear to be best suited *for acceptance testing* of consecutive shipments of the same brand of abrasive.

Both the stabilized-loss test and the total-breakdown test can be applied *for comparing* the breakdown properties of *different abrasives* in view of their use in a production machine; this is provided that the testing machine has been adjusted in accordance with production-conditions prevailing. The K-50, sample-weighing and microscopical-weighing methods as originally proposed, should not be used at all.

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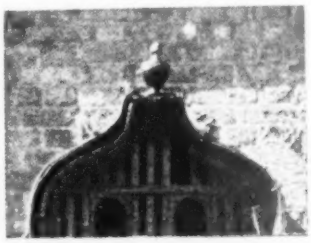
[3] "Metallische Strahlmittel und ihre Prüfung," by E. Bickel in "*Stahl und Eisen*" of August 22, 1956.
[4] "Die Prüfung von metallischen Strahlmitteln," by E. Bickel in "*Stahl und Eisen*," **26,** 1960.
[5] "Zur Standzeitprüfung von metallischen Strahlmitteln," by P. U. Schmithals and H. G. Labisch in "*Stahl und Eisen*," **26,** 1960.

## Cast-iron Dovecote



Dovecote set into the wall of a warehouse in Wisbech, built in Queen Anne style.

Unique in the annals of cast iron were the dovecotes cast in this grey metal. Among the earliest there appears to be record of was one set up at Fallmore Hall, Co. Louth, Ireland, by Squire Bigger. It was cast in 1818 in the Dundalk foundry and was the pole type of pigeon house. The cote was 30-in. square and 40 in. to the eave of its cast-iron roof which was formed spire-like with ornate crockets and a finial. The walls of the cote and the roof were each in four separate castings, having a beaded lapped joint to make the inside weatherproof. There were six pigeon-holes in each side and cubicles to correspond with the holes. The dividing walls inside and the interior of the outer cast-iron walls were lined with wood with floors of the same material. Between the iron and the wood tow-felt was inserted to reduce the extremes of heat and cold. The alighting-boards were also of cast-iron supported by ornate brackets. The pole, which was 25-ft. high, was cast in telescopic-joint sections.

In a warehouse at Wisbech built in the Queen Anne style there is a cast-iron façade to a pigeon-house in one of the windows as here depicted which is of interest in relation to cast-iron and doves. There are two holes for the birds to enter their house in a hole in the wall. The writer can recall a cast-iron frontal apex in a warehouse gable of the Academy St. Belfast which contained several pigeon-holes all having cast-iron alighting-boards. It was obvious that cast iron was used instead of wood because of its durability and it was neater than mere holes in the brickwork.

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MR. L. S. CARSTAIRS has been appointed chairman, and Mr. J. K. HOWARTH managing director, of Barrow Haematite Steel Company, Limited.

# Cast Lead in Modern Industry

In a paper read at the European Conference for Chemical Technology "Achema" Congress held earlier this year, Mr. E. R. Newson (of Associated Lead Manufacturers, Limited, Chester) took for his subject "Lead Applications to Modern Industry," and what follows is an abstract of some of the main points raised.

In his opening remarks, Mr. Newson said that the well-known and traditional uses of lead in industry were principally connected with heavy chemicals, including sulphuric-acid manufacture, pickling plants, gas-precipitation units, dissolvers, tank linings, all of which depended mainly upon good chemical resistance to corrosion of lead, and not to any great extent on its physical and mechanical properties. However, with modern industrial conditions demanding higher output rates, purer products and many new products, the applications for lead were being extended, involving higher temperatures and calling for greater resistance to creep and improved mechanical strength. The need for vessels capable of withstanding corrosive liquids, under working conditions entailing alterations in temperature, had increased the demand for uniform lead linings and better production methods.

### Electronics Industry

The development of nuclear energy had resulted in the use of lead in large quantities for gamma-ray shielding, where high density combined with comparative ease of fabrication of complicated units, had proved of great value. Wider applications for semi-conductors in the electronics industry had given rise to a demand for lead and its alloys of extremely-high purity for use in solders and as doping agents for the manufacture of semi-conductor devices. Improvements have been made in the mechanical properties of solders which had to withstand sub-zero temperatures or higher temperatures than hitherto, and special alloys were now available to meet these needs.

Among the more recent developments involving lead was the introduction of alloys such as lead/indium for bearings, and mixtures of lead with plastics such as polythene for nuclear installations, where shields had to protect against both neutrons and gamma-rays.

### Nuclear Shielding

With the development of the use of nuclear energy there had grown a need for shielding from radioactivity which, in many cases, was satisfactorily dealt with by using lead as the shielding material. The combined need for compactness and adequate protection against radiation had resulted in many tons of lead being used in shielding marine-propulsion units. A system of "overlapping" shielding material had been devised which would enable multi-layer lead shields to be constructed for quite large reactor-containment vessels, and, at the same time, permitting of easy removal of small areas of shielding for examination of the containment vessel at isolated points.

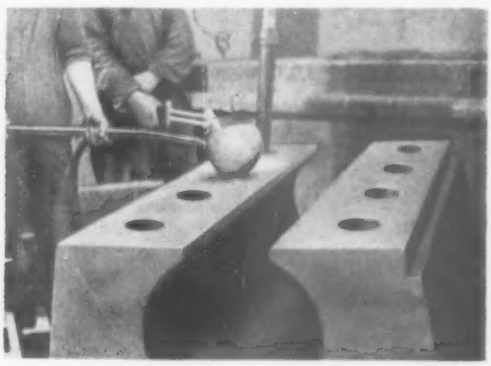
Transportable containers for high-energy gamma-ray sources, charge/discharge machines in nuclear-power stations, containers for storage and transport of spent fuel elements and radioactive isotopes, radioactive waste disposal, shielding in medical work and laboratories where radioactive materials had to be handled, were just a few examples of applications which called for lead fabrication in various forms.

### Large Castings

At the Chester works of Associated Lead Manufacturers, Limited, Mr. Newson said that large cast-

FIG. 1.—*Shielded chamber containing calorimeter shields typical of the production from the works of Associated Lead Manufacturers, Limited.*

FIG. 2.—*Lead-filling operation of a container for the nuclear-engineering industry at the Chester works of Associated Lead Manufacturers, Limited.*



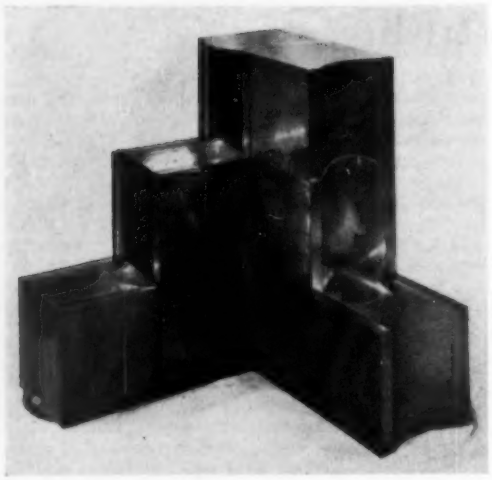


FIG. 3.—*Curved-surface mating bricks (4 in.) made by Associated Lead Manufacturers, Limited, and used for semi-permanent shielding in laboratories, etc. The machining of these bricks for flush fitting proves their soundness—very necessary if they are to form an effective barrier against radiation.*

ings weighing up to 20 tons had been made in one piece. With such operations, as indeed with all lead casting, special precautions had to be taken to ensure freedom from blowholes and shrinkage cavities. This work demanded extreme care and experience to ensure sound castings and hence complete protection from radiation. Co-operation between the designer and fabricator from a very early design stage was of obvious advantage in producing containers for filling with lead. Location of pouring holes, position of vessel during the filling operation, application of heat and controlled cooling were but a few of the important details which needed careful consideration. Fig. 1 shows an example of a shielded chamber containing calorimeter shields and Fig. 2 is a view of the filling operation of a container made by the speaker's firm.

In addition to refined lead, the alloy most commonly used for shielding in atomic-energy work was lead containing 4 per cent. antimony on account of its favourable casting and machining properties, and this alloy was generally used for bricks and articles which needed to be finished with fine tolerances, screwed and threaded. The shielding of instruments used to detect gamma-rays of low intensity was almost invariably carried out in lead which had been mined for at least 50 years and hence had a low background-count.

A now-familiar product used for semi-permanent shielding in laboratories, experimental nuclear reactors, etc., was the lead brick. These were made in various standard sizes, with chevron or curved mating-surfaces, for walls varying in thickness from 2 to 10 in. or more (Fig. 3). In the early days, bricks were generally acceptable as-cast, but the finish machining of all surfaces was now more usual as this ensured dimensional accuracy and helped to demonstrate the solidity of the metal. Fig. 4 is a selection of small machined parts and castings also manufactured at the Chester works of the speaker's firm.

FIG. 4.—*Selection of small machined parts and castings, typical of the wide range of items produced by the Author's company.*

# Equipment and Supplies

## Vacuum Induction-melting Furnace

Wild-Barfield Electric Furnaces, Limited, of Watford, Herts, have recently received an order from Bristol Siddeley Engines, Limited, for an NRC type 2551-B vacuum induction-melting furnace of capacity of 12-17 lb. molten steel or an equivalent volume of other metals. Power is to be supplied by a 30-kw. motor/generator set and the pumping system is designed to give pressures down to $10^{-3}$ mm. Hg. The furnace is being supplied with a booster diffusion pump with provision later for the addition of a high-vacuum diffusion pump for melting at lower pressures if required. The chamber is of stainless steel and measures 30 in. dia. by 32 in. long; an inlet valve for the admission of an inert gas is provided. With a standard magnesia crucible, the furnace is capable of temperatures up to 1,700 deg. C. A particularly interesting feature of the equipment is that the melting coil is fitted with a replaceable crucible assembly for the rapid changing of crucibles, with the coil *in situ*. The design includes provision for viewing, charging, alloying, pouring, cover lifting and bridge breaking as well as means of measuring melt temperature. A bulk charging chute of 40 cu. in. capacity is provided. Melting time for steel is said to be less than 30 min.

## Valve

A number of criticisms have been levelled in the past on the quality of pneumatic and hydraulic valves for automatic plant for foundries. It is felt, therefore, that interest will be shown in the Perrett Hydrovalve (designed and manufactured by Perrett Control Company, Limited, Green Lane, Hounslow, Middlesex), which is a globe-type valve, designed to control the flow of liquids or gases up to a pressure of 125 lb. per sq. in. The new valve has been produced for operation by remote control by pneumatic or hydraulic power and is stated to be particularly suitable for inclusion in process control and automatic systems. The valve is constructed in non-ferrous metals throughout, with synthetic-rubber valve-seats, piston cups and gland seals. The makers claim that this valve is only two-thirds the size of its manually-operated counterpart, and all components are readily accessible for servicing. The valve is available in sizes ranging from ½ to 3 in. with British (BSP) or American (NPT) threads and flanges.

## Cooling Tower

Midland Heating & Ventilation Company, Limited, Bedford Road, Birmingham, 11, have recently added the "Aquamiser" Durapack to their range of water-cooling towers. The new unit is a low silhouette cross-draught tower and is claimed to be particularly suitable where quiet, unobstrusive operation is required. Other features of the unit are that it incorporates a plastic packing, stated to be free from galvanic action and indestructible in any type of atmospheric pollution; the casing is normally of mild steel (but can be of fibreglass), and distribution is provided by gravity-feed from a top pan through large-diameter holes. The fan is slow running, fully weather-proof with an all-welded casing, and direct-coupled with an impeller of the propeller type. All towers manufacturered by the company have, it is stated, an efficient eliminator as a standard model and the Durapack is available in a range of nine sizes, full dimensions being available on request to the makers.

*The "Aquamiser" Durapack, recently added to the range of water-cooling towers manufactured by Midland Heating & Ventilation Company, Limited, Birmingham.*

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**"Kiss-of-Life" Resuscitation:** Resusci-Anne, a life-size doll for demonstrating mouth-to-mouth and mouth-to-nose artificial respiration—or the "kiss-of-life" technique—is now being marketed by the British Oxygen Medical Department. This training manikin is specially designed to provide practicable instruction in direct artificial respiration. It does away with any physical unpleasantness and minimizes the risk of cross infection that can arise where live subjects are used. The doll consists of an inflatable body with a detachable head, shoulders and lungs. When air is blown into the lungs the chest expands, the capacity of the lungs and their resistance to inflation being approximately the same as that of an unconscious human. The equipment is supplied in a suitcase (approximately 25½ by 16½ by 8½ in., weighing about 33 lb.), and includes an air pump, mouth inserts, disinfecting apparatus and a plastic model of a head section for demonstration purposes.

**Packaging:** Samples of "mini-Grip" polythene envelope-type bags have been received by the JOURNAL office from Supreme Novelty Company, Roeder House, Vale Road, London, N.4. The bags could be used in laboratories for samples of sand, drillings and the like, and features claimed for them are that they can easily be sealed after repeated use and carry white panels for labelling. As they are transparent, they should be useful also for the carrying and demonstration of small castings by sales representatives. The bags are available in three sizes, exclusive of the grip section, *viz.*, 3 by 3¼, 3½ by 4½ and 4 by 5½ in.; a smaller one (2½ by 3 in.), is produced without an inscription panel.

**Chromating Process:** Pyrene Company, Limited, Brentford, Middx, announce that to meet a demand for a chromating process suitable for large-scale production, they have introduced the Bonderite "250" series. This series of processes is designed to operate at room temperature and to produce—on hot-dipped galvanized steel, electro-zinc plated steel or zinc-base alloys—chromate coatings which give considerable corrosion protection. The coatings also form an excellent surface for subsequent painting, it is stated.

## ESC "Trainee" Successes

The overall shortage of technically qualified people, such as craftsmen, technicians and research workers, was deplored by Sir Michael Denny, chairman of Cammell Laird & Company, Limited, and a director of English Steel Corporation, Limited, when presenting the awards at the annual prize distribution of ESC in the Memorial Hall, Sheffield, on December 8. He went on to congratulate ESC on what they had done to rectify the overall situation.

Mr. H. Parkin, chief education and training officer of English Steel, said in his annual report "We are now training young people to the limit of our capacity. If the same policy is pursued by other firms in Sheffield, then the Youth Employment Service should have no difficulty in catering for the needs of young people leaving schools during the "bulge" period. However, our experience shows that some firms are not pulling their weight, and this position is brought home forcibly to us by the constant "poaching" of ESC trained people. We do not expect to retain all the people we train—but the problem can be serious if it becomes a case of one-way traffic only."

Mr. Parkin reported that recruitment this year had been satisfactory at all levels. The number of young people in employment reached its highest level since before the war. The total of 1,050 young people at the Sheffield works of ESC was an increase, in the case of those under 21 years, of 20 per cent. over 1957.

Two-thirds of those who took examinations this year were successful. K. A. Ridal had obtained his Doctor of Philosophy at Sheffield University; G. A. Redfearn had qualified for an Associateship in Metallurgy at the University; and John Drewery had qualified for a Master's Degree in engineering. Four more employees had won higher national diplomas and four had been awarded licentiateships of the Institution of Metallurgists.

## Colvilles' Profits down

Reporting a fall in consolidated profits from £16,170,000 to £13,740,000 in the year ended September 30, 1961, the directors of Colvilles, Limited, state that present indications are that the current level of operations is being maintained, and although lower than last year, it is still profitable. There are, as yet, "no signs of a revival." The net profit for the year, after all charges, including the transfer of £3,000,000 (same) to general capital reserves, was £4,606,319 compared with £4,980,211. The final dividend of 10 per cent. on the increased capital makes an unchanged total for the year of 16 per cent.

Production of pig-iron by the company during the year was a record at £1,041,531 (963,586) tons. Output of steel ingots and castings was 2,041,947 against 2,056,467 tons, and that of coke was 806,379 (698,067) tons.

During the first half-year, it is stated, demand was well maintained but declined noticeably during the second half. However, over the year as a whole the fall in sales and output was slight. The decline in profits was aggravated by increases in costs of fuel, wages, transport charges, and local rates. These increases have been only partially reflected in the selling prices fixed by the Iron and Steel Board.

Progress in the construction of the strip mill development scheme has been satisfactory. The expenditure during the year on all schemes totalled £33,095,091.

## Belgian Foundry Association's Jubilee

The *Association Technique de Fonderie de Belgique* this year celebrates the 50th anniversary of its establishment and to mark the occasion a special edition of *La Fonderie Belge* has been issued. It must be unique for a founder of a technical association—in this case, Mr. Ivan Lamoureux—to be able to speak or write, after a lapse of 50 years, of an association's very beginning, but in fact Mr. Lamoureux does contribute the opening article in this issue. Continuing a survey of the contents of the publication, Mr. Robert Doat, president, in a fascinating article has detailed the history of the *Association* and commented on the work done by Dubois, Ledent, Léonard, Masson, Ropsy, Rémy, Kagan, Peidboeuf, Varlet, Halbart, Goffart, Iweins and De Sy.

Mr. Goffart has contributed an excellent article on the past history of the foundry industry and its future, whilst Mr. René Déprez has written an authoritative article on international foundry co-operation. Professor De Sy has written on the subject of foundry research and the not inconsiderable part played by Belgium. The commercial aspects of the Belgian foundry industry have been dealt with by Mr. Paul de Keyser, who directs the Belgian foundry employers' federation. The secretary of the *Association*, Mr. A. Pirson, has, in his article "The Foundry and Modern Art" reproduced some weird and wonderful pictures of the piece of statuary, "Family Group" and the foundry methods used in its production.

The JOURNAL sends to the members, president and Council of the *Association* congratulations on the achievement of their Golden Jubilee and best wishes for its future prosperity.

## Long-service Awards at Falkirk

A memorable occasion was celebrated at Gothic Works, Camelon, Falkirk, recently when a number of employees of R. & A. Main, Limited, were presented with long-service awards. The presentations took place in the canteen where the assembled gathering was addressed by Mr. P. D. M. Aird, chairman of Glover & Main, Limited, the parent company. Mr. Aird stressed the difficult times through which the domestic-appliance manufacturers are passing and said that he looked to the "hard core" of the older employees to encourage stability and understanding among the younger members of the staff. Employees with over 40 years' service were each presented with an inscribed gold watch and employees who had reached 25 years' service since the last presentation received an inscribed barometer.

## Two American Foundries closed down

One of the best known American grey-iron foundries, headed by Mr. Walter L. Seelbach, is after 71 years of operation to close down. The Superior Foundry was located in Cleveland and employed 350 people. Mr. Seelbach is a past-president of the American Foundrymen's Society, the International Committee of Foundry Technical Associations and the Gray Iron Institute of which he was a founder and the first president.

Another old American concern—it was founded in 1837—the Fulton Machine Company, also of Cleveland, has been closed down. The reason given in both cases is excessive labour costs.

# New Patents

*(Copies of complete specifications are obtainable from the Patent Office, Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 4s. 6d.).*

**860,717** Coleman-Wallwork Company, Limited, 32 Victoria Street, London, S.W.1.

A new or improved means for use in a system in which the moulds are prepared in an inverted position, followed by a turnover position to bring the moulds top side up. After this the moulds are poured and then delivered to normal subsequent operations.

**860,899** Daimler-Benz AG., Stuttgart-Unterterkeim, Germany.

A cylinder-liner comprising a steel barrel provided internally with a centrifugally-cast metal layer which provides the working surface, and with, externally, air-cooling fins of aluminium.

**860,904** American Cast Iron Pipe Company, 2930, North 16th Street, Birmingham, Alabama, USA.

A new method of forming sand linings of substantial thickness in cylindrical metal refractory-lined moulds.

**861,020** Badische Maschinenfabrik A.G., Seboldwerk, Karlsruhe-Durlach, Germany.

Moulding-box distributing machine. For the feeding of the copes to the upper roller conveyor and the drags to the lower roller conveyor, there is provided a lifting device having a lifting tackle with a roller conveyor articulated at one end to the table and connected at the other end to a lifting cylinder arranged on the lifting table.

In Patent, **861,126** this same company claims a method and means for the manufacture of moulds ready for casting by the use of automatically-operated machines.

### Australian Patents

*Photostat copies of the following Australian Patents are available from the UK Patent Office, price 9d. per page. The address given is that of the agent for Service.*

**230,655.** Dependable Pattern Works, Inc., A. W. Smith, 358, Collins Street, Melbourne. (31 sheets.)

A machine for making shell cores from resin-coated sand. The inventors claim to have discovered a way of forming these shell cores by directing a jet, or jets, of a combustible air/fuel mixture directly against the external surfaces of the mould box. If these jets are uniformly patterned and dispersed over the mould-box halves, shell cores may be produced quickly and of uniform quality. The flame being projected upon the mould-box halves eliminates any intervening heat transmitting mechanism and the expense of mounting the halves and the heating is therefore stated to be eliminated.

**230,728.** Metropolitan Vickers Electrical Company, Limited. Clement Hack & Company, 414, Collins Street, Melbourne, Victoria. (7 sheets.)

The manufacture of a mould or core which includes the intermediate step of spraying or otherwise treating the mould or core interface with a solution of hydrolyzed ethyl silicate after the mould or core has been made, and before the mould or core is subjected to the ammonia gas which will solidify both the composite material of which the core or mould is made, and the silicate solution.

**231,478.** Shigeru Nishihata, Phillips, Ormonde, Le Plastrier and Nelson, 37-41, Queen Street, Melbourne, Victoria. (10 sheets.)

A method of producing a mould for use in centrifugal casting of tubular bodies. The mould is made by lining a flask with a mixture of a fire-proofing sand material and a resinous binder. This mixture can be introduced into the flask by a long conduit extending through the entire length of the flask, while it is rotating.

**231,480.** W. M. Goldhamer, Phillips, Ormonde, Le Plastrier and Nelson (address as for No. 231,478). (28 sheets.)

A die-casting machine which has means for removing the gas from the die-cavity—including the small amount of residual gas which is concentrated or compressed by the advancing metal forced into the die cavity.

**231,491.** General Motors Corporation, Phillips, Ormonde, Le Plastrier and Nelson (address as above). (10 sheets.)

Improvements in the manufacture of thin-walled foundry moulds. The setting and curing of the binder is effected by exposure to a curing agent in gas or vapour form (such as chlorine), hydrogen bromide, ammonium chloride, hydrogen iodide, or sulphur dioxide). The remaining acid is then neutralized with ammonia.

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# Publications Received

**Rôle of Molybdenum and Copper in Corrosion-resistant Steels and Alloys,** by Francis B. Foley. Published by Climax Molybdenum Company, 1270, Avenue of the Americas, New York 20, New York, USA.

This 56-page beautifully-illustrated brochure traces the history of corrosion-resisting steels from their inception to the present time, and contains many tables of compositions used by various firms throughout the world. These tables are supplemented by a series of illustrations, many of which are of complicated valves and pump castings made from the newer alloys. Recipients of this brochure can indeed count themselves fortunate, for it contains a wealth of easily-assimilated technical data, otherwise difficult to obtain in book form.

**Transport Age, No. 19.** Published by the British Transport Commission, 222, Marylebone Road, London, N.W.1; price 7s. 6d.

This issue carries a story with a foundry flavour as it covers the removal of the foundry plant of Light-alloys, Limited, from Willesden, London, to Beverley in Yorkshire. It involved moving no fewer than 300 wagon loads.

The area specially dealt with in this issue is Northamptonshire—a county with important foundry interests. As usual the publication is prolifically and beautifully illustrated.

**Annual Report** of Arthur D. Little, Inc., Cambridge, Mass., USA.

This international firm of engineering consultants this year celebrates its 75th anniversary. The president, Mr. James M. Gavin, having been appointed as American Ambassador to France, is handing over to Mr. Raymond Stevens. The company's interest in foundrywork is that it includes the American branch of the Shaw Process organization amongst its clients.

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Mr. D. F. TEDDS and Mr. K. C. SHARP have received the Insignia Award of the City and Guilds of London Institute (see also meeting report, page 778).

# Notes from the Branches

## Northampton Section

Mr. D. F. B. Tedds, foundry manager of the Bristol Aeroplane Company, visited the Northampton section of the Institute of British Foundrymen in late autumn to present his paper entitled "Investment Casting." After giving a brief history of the lost-wax process, Mr. Tedds said that his company had been working with this process for 17 years and in spite of their obvious progress and "know how," he felt that the "surface had only been scratched." He pointed out that other similar processes such as forging, machining and fabrication have been developing steadily for 100 years—five times as long as investment casting.

### Foundry Set-up

The Bristol foundry covers 40,000 sq. ft. and employs 250 people. Production is 1,000 to 2,000 moulds per week and the average weight of castings per mould is 15 lb. The system of investment casting is well known to most foundrymen, being the manufacture of a wax pattern from a suitable die followed by dipping or spraying refractory coatings on to this wax pattern. When the refractory coatings have been dried the wax is melted out and the refractory baked; it is then ready for filling with molten metal. Gas-turbine blades and wheel segments are typical products, the foundry holding their as-cast dimensions to $\pm 0.003$ in. per in. Whilst the process is expensive, the overall cost of the product including machining is often cheaper by this method than any other production techniques. In fact in some cases, machining is impossible and investment casting is the only possible method on a production scale.

*Discussion*

Question time was received with customary enthusiasm. Mr. Tedds in his replies said that the special refractory mixes which he had described were best suited to this type of work; if shell cores were used, then as soon as the mould was fired the resin would be burned out of the shell sand and the core would disintegrate. The refractory wash employed was composed of alumina cement and silica sol, and, he said, a slump test had been developed to determine the viscosity of the semi-solid mixture used. Asked what advantages the lost-wax process had over the frozen-mercury system, he replied that the Mercast process had no particular advantage, but that the low temperatures required for the mercury process were inconvenient and the use of mercury was a hazard to health which was not present in the lost-wax process. For another member he listed a variety of metals he used, which varied in cost between 4s. 6d. and 25s. per pound weight, and he also gave several examples of industries other than aircraft constructors who were using the products of investment casting. These included firms making sewing machines and textile machinery, and, said Mr. Tedds, utilization of the process was also spreading to the motor-car manufacturers.

The paper was extremely well illustrated by about 50 slides and was put over very clearly. In spite of the fact that the subject was new to this audience, the lecturer held everyone's interest and whetted their appetites to hear and perhaps see more of this very specialized side of foundrywork.

Mr. W. J. Wood proposed a vote of thanks and complimented Mr. Tedds on the excellence of his talk. This was seconded by Mr. J. W. Deaton, junior vice-president, who said that he would be pleased to know if it were possible to visit this interesting foundry at some future date.

## Sheffield

In a lecture to the Sheffield branch early in December, Mr. R. Lee of Edinburgh, dealt with "Foundry Problems Associated with the Manufacture of Iron Rolls." Dr. R. V. Riley, branch president, welcomed Mr. Lee who then presented a most carefully prepared and well delivered paper in which he summarized a lifetime's experience of the manufacture of cast-iron rolls. The lecture was well illustrated with slides showing the practice of roll-making and illustrating vividly some of the faults which must be avoided. Chill, grain, steel-base and spheroidal-graphite-iron rolls were described in some detail.

The lecturer stressed the importance of securing a "good spin" of molten metal during casting so as to sweep out the inclusions and prevent surface defects. Mould "chills," he said must be completely free from rust and be stored prior to use in a warm place to eliminate moisture which can lead to pinhole defects. The blacking applied to the "chills" must be regular in thickness. Electric drying stoves were used to avoid deposits of products of combustion which could result in poor finish on the roll surface.

Mottle spread, one of the bugbears of rollmakers, was now more completely understood, thanks to the work of the British Cast Iron Research Association. Mr. Lee showed interesting examples of inverse chill, "comet" markings and "nigger heads." He explained the use of the chill-test method of quality control and the metallurgical effects of various melting units. Mr. Lee was greatly in favour of the mains-frequency induction furnace for melting. Casting temperatures as low as possible were desirable, he said, but he did not agree with the use of feeding rods. Cracking in roll bodies he claimed was now a thing of the past, but could re-occur unless great care was exercised at all stages in the foundry practice. The metal quality also must be kept absolutely constant and under complete control.

*Discussion*

Mr. Shaw opened the discussion with a question about the possible effect on health of the fumes evolved during the machining of s.-g. iron. Mr. Lee, in reply, thought that this feature had been over-emphasized and in his view, no health hazard existed at all.

In answer to a question from Mr. Murray, the lecturer outlined the method of determining hardness with the scleroscope but was not able to state precisely the effect upon the roll hardness of cooling water applied to the hot roll during use. S.-g. iron rolls, he said, must be kept low in nickel content to avoid hot-cracking. Answering Mr. Donaldson, Mr. Lee said it was not possible to reverse the metallurgical effects of superheating of the iron during melting and for this reason he favoured a melt which had never exceeded 1,370 deg. C.

At the conclusion of question time, Dr. L. Harrison proposed and Mr. T. Greensmith seconded a vote of thanks to the lecturer.

## London

The London branch of the Institute has now obtained a fixed booking for its annual dinner/dance as the second Friday in December, and this year it fell on

*Smiles for the photographer at the IBF London branch annual dinner:—(a) the branch president, Mr. A. R. Parkes, and Mrs. Parkes receiving the guests; (b) Mr. and Mrs. W. J. Pym (with the branch secretary, Mr. Thos. Wills, in the background); (c) Mrs. Richards, wife of the IBF national president, chatting with Mrs. Lambert; (d) Mr. R. F. Horton, IBF junior vice-president, with Mrs. and Miss Horton; (e) Mrs. Webster, wife of the IBF senior vice-president, with Mr. Webster, junior, and (f) Mr. W. R. Buxton, branch social secretary, and Mrs. Buxton. The number attending—nearly 400 members, their ladies and guests—is thought to be a record for this event in recent years.*

December 8. The function was held in the Grand Hall of the Connaught Rooms, in Great Queen Street, and attracted an attendance of approximately 380 members, their ladies and guests—probably a record. Mr. A. R. Parkes, the president, supported by Mrs. Parkes, received the guests and afterwards took the chair. In the branch, this gathering is regarded as "ladies' night" and thus speeches were at a minimum. Mr. R. F. Horton, junior vice-president of the Institute, proposed the toast to the "London Branch and the Institute" and also welcomed the ladies, and Mr. Parkes replied. Thereafter the evening was given over to a sparkling cabaret show—a troupe of eight dancing girls (for one appearance supported by half-a-dozen members of the branch dressed up as girl-guides)—and dancing until 1 a.m. to Peter Alan's sextet.

It was unfortunate that the function this year clashed with a gathering of the Worshipful Company of Founders which at the last minute claimed attendance from a number of principal members of the Institute and the branch. Included amongst these were the national president, Mr. D. A. Richards, and the senior vice-president, Mr. G. R. Webster. However, several of the ladies of those attending the Founders Company function were able to attend the London branch party and later in the evening their husbands joined them. These late additions to the gathering augmented the number almost to 400.

Thanks are due to Mr. W. R. Buxton, social secretary, Mr. Thos. Wills, branch secretary, and the branch stewards for the excellent arrangements.

## House Organs

**The Stantonian, Vol. 22, No. 9.** Published by the Stanton Ironworks Company, Limited, near Nottingham.

The cover of this magazine—a picture taken in the grounds of Alton Towers—is particularly pleasing. The contents are alike varied and interesting and attention is especially drawn to articles on the practical use of the British Standards Institution's "Kite" mark scheme, and the prevention of fires caused through the misuse of electric domestic appliances. There is also a hint for those approaching retirement, as an old Stantonian, Mr. R. Allsopp, has found a pony and trap provides a means for enjoying leisure hours. This magazine certainly gives an excellent cross-section of life in an industrial community.

**Cupola Vol. XII, No. 4.** Issued by the Carron Company, Falkirk.

The main news in this issue is the receipt of a £20,000,000 contract for the supply of iron segment castings for the Jarrow-Howden tunnel under the Tyne. It is believed to be the largest order ever obtained by a Scottish ironfoundry.

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The autumn issue of *Staveley News*, house organ of the Staveley Iron & Chemical Company, Limited, near Chesterfield, announces the retirement of Mr. Joe Fletcher, the patternshop foreman since 1945. He was the recipient of several presents from his colleagues. He is to be succeeded by Mr. S. Cantrill.

# Personal

MR. A. H. JACKSON, A.M.I.MECH.E., formerly Liverpool district manager of Leyland Motors, Limited, has now been appointed London area sales manager of the company.

MR. A. E. SQUIRE, general manager of Grazebrook Foundry, Limited, Dudley, Worcestershire, has been appointed a director of the company with effect from January 1, 1962.

MR. R. C. JENKIN has been appointed manager of a new office opened by Associated Electrical Industries, Limited, for the Midland region of the home district at Alma Street, Coventry.

MR. E. ASKEY has been appointed a director of Eldon Hill Quarries, Limited, and Derbyshire Mineral Mines, Limited, Chapel-en-le-Frith, Derbyshire, both subsidiary companies of Thos. W. Ward, Limited.

Deputy chief engineer of the British Motor Corporation, Limited, for the past two years Mr. C. A. GRIFFIN has been appointed chief engineer in succession to Mr. A. ISIGONIS, who recently became technical director.

MR. W. G. SALISBURY, former head of the steel-user section of the BISRA laboratories at Sheffield, has been appointed personal assistant to Mr. Edgar Denton, managing director of C. R. Denton Steel & Tool Company, Limited, Sheffield.

MR. R. S. ROBINSON, of Tube Investments, Limited, was appointed chairman, and Mr. A. V. ALBUTT, deputy chairman, of the new Midland Regional Board of the Institution of Works Managers, at its first meeting in Coventry earlier this month.

MR. G. C. IVESS, managing director of Spelthorne Metals, Limited, a member of the Berger, Jensen & Nicholson group of companies, has been seconded to Montreal for one year to take over the management of Jenson & Nicholson (Canada), Limited. He left the UK to take up the appointment on December 13.

MR. R. E. PURDHAM has been appointed chief engineer and member of the executive of Baker Perkins, Limited, Bedewell Division, Bedewell Works, Hebburn-on-Tyne. He is a member of the South African Institute of Electrical Engineers and the Institute of Certificated Electrical and Mechanical Engineers.

MR. A. J. SCAMP is to become personnel director with a seat on the board of the General Electric Company, Limited, on January 1. He has been released by Massey-Ferguson (UK) in which company he is director of personnel and industrial relations. He will relinquish his directorships of both Massey-Ferguson and F. Perkins, Limited, on December 31.

MR. JOHN BOYD-CARPENTER, Minister of Pensions and National Insurance, has made the following new appointments to the Industrial Injuries Advisory Council for the new term which began on November 30:—Dr. ALICE M. STEWART, M.A., M.D., M.R.C.S., L.R.C.P., Mr. S. CHAPMAN, C.B.E., Mr. G. H. LOWTHIAN, M.B.E., Mr. A. MARTIN, Mr. J. G. C. MILLIGAN, Mr. L. SHARP, M.B.E.

MR. A. E. PERCIVAL, C.B., has been appointed secretary to the Exports Credits Guarantee Department with effect from January 1 next, in succession to Mr. L. J. MENZIES who is resuming his duties at the Bank of England. Mr. J. B. L. MUNRO, C.B., C.M.G., Under Secretary in the Board of Trade, has been seconded to the Department also with effect from January 1 next.

MR. W. C. SPROSON is to resign as chairman of Wolverhampton Die Casting Company, Limited, on January 31, but will remain on the board. Mr. R. Whitehead, who was chairman until 1955, has agreed to assume the office on February 1 for a period of not exceeding two years. Mr. Sproson and LORD KIRKWOOD, deputy chairman, are reducing their business activities for health reasons.

THOMAS TILLING, LIMITED, announces the following changes in directorships in the companies of the group:—Mr. J. MCKELL is resigning from the boards of Bagshawe & Company, Limited, and Sklenar Furnaces, Limited, and Mr. P. M. MEANEY is being appointed to the boards of Bagshawe & Company, Limited, and Sklenar Furnaces, Limited, as well as a number of other firms in the group.

LORD PLOWDEN, a vice-chairman of Tube Investments, is to succeed SIR IVAN STEDEFORD as executive chairman on January 1, 1963. Sir Ivan will become the company's first life president on that date. Sir Ivan, who had intended to retire in January next upon reaching 65, has agreed at the request of the directors to continue in office as executive chairman until the end of 1962 and then to serve as a non-executive director.

MR. G. U. NODEN, foundry manager with the Barrow Haematite Steel Company, Limited, has been appointed a director of Barrow Quarries, Limited, a subsidiary. Other appointments in the company include MR. G. A. CLOUSTON, general works manager, as director of the Darwen and Mostyn Iron Company; MR. S. OGILVIE, assistant secretary, as secretary, and MISS J. M. CLARKE, private secretary to the managing director, MR. J. K. HOWARTH, as his personal assistant.

The British Association of Machine Tool Merchants (Incorporated) has elected MR. CLIFFORD OLDFIELD (C. & G. Oldfield, Limited) president for the ensuing year in succession to MR. WALTER E. NORTON (W. E. Norton (Machine Tools), Limited), of London, who remains on the Council as the immediate past-president. MR. G. B. BLACKBURN (William Watts, Limited), of Nottingham, becomes vice-president, and MR. E. J. F. BRADLEY (Pidgen Bros., Limited), of London, honorary treasurer.

MR. MARTIN LYTH, M.A., A.M.I.MECH.E., has recently been appointed director of supplies to Griffin & George (Sales), Limited—a new post. Previously he was managing director of Griffin & George (Scientific Instruments), Limited, a subsidiary company. Mr. Lyth began his engineering career as an aerodynamicist in Sir Frank Whittle's firm, which was pioneering the jet engine and later spent seven years as a management consultant with Production Engineering, Limited, before joining Griffin & George in 1957.

MR. V. R. PREHN, managing director of Ruston & Hornsby, Limited, engineers, Lincoln, is to retire on December 31. He has been connected with the oil engine industry since 1921 and joined Ruston & Hornsby in 1937. During the second world war he had responsibilities for the production of tanks and other fighting equipment. He will be succeeded by Mr. C. T. ALDERSON, the present deputy managing director, who is the grandson of Sir George Alderson, the first overseas agent for Ruston & Hornsby. His family has an unbroken association with the firm for 90 years.

## Steel Production in November

An improvement in steel production in November is reported by the Iron and Steel Board in its monthly statement issued on December 14. Output was at an average rate of 420,200 tons a week, representing the use of 79 per cent. of capacity. The November rate was 5 per cent. greater than in September (production in October was affected by the labour dispute in South Wales), but 17 per cent. below that for November, 1960.

The annual rate of steel production during the first 11 months of 1961 was 22,400,000 tons. With the expected seasonal fall in December, the total for the year may prove to be a little less, possibly 22,250,000 tons, the Board estimates.

The fall in production below the range of 24,000,000-25,000,000 tons estimated earlier in the year results very largely from the heavy withdrawals from stocks which have been taking place since the early summer. Of the other elements in the demand for steel, home use has fallen only slightly below the estimate for the second half of the year, while exports of steel have been well maintained and may exceed the 1960 total of 4,080,000 tons.

Latest pig-iron and steel output figures (in tons), with the corresponding 1960 returns, are shown in the following table:—

| Period. | Pig-iron. | | Steel ingots and castings. | |
|---|---|---|---|---|
| | Weekly average. | Annual rate. | Weekly average. | Annual rate. |
| 1961—September .. | 260,700 | 13,554,000 | 400,200 | 20,811,000 |
| October .. | 248,300 | 12,914,000 | 382,200 | 19,872,000 |
| November .. | 269,600 | 14,018,000 | 420,200 | 21,851,000 |
| 1st 11 months | 286,400 | 14,895,000 | 430,400 | 22,381,000 |
| 1960—September .. | 305,800 | 15,900,000 | 481,000 | 25,012,000 |
| October .. | 313,900 | 16,321,000 | 497,000 | 25,842,000 |
| November .. | 315,000 | 16,382,000 | 504,500 | 26,234,000 |
| 1st 11 months | 302,900 | 15,750,000 | 468,800 | 24,37600 |

## British Standards Institution

In its *Newssheet* for December, the British Standards Institution lists amongst New British Standards, BS 3436:1961, Ingot zinc, which covers the chemical composition of four grades of ingot zinc and replaces the following standards:—BS.220, fine zinc; BS. 221, special zinc; BS. 222, foundry zinc; and BS. 1003, high-purity zinc (price 4s.).

The Institution also announces publication of a third edition of BS. 1000A, concerned with universal decimal classification. Amongst other modifications, the new edition contains completely new sections on nuclear physics and technology, whilst thoroughly revised sections include analytical chemistry and electronics. It is hoped the new edition will be welcomed, both by the many who already use the universal decimal classification (as a means for checking or bringing up-to-date their existing files) and by others who, though not yet familiar with the system may wish to use it in setting up an efficient information service. Copies of this standard may be obtained from the sales branch of the Institution at 2, Park Street, London, W.1; price £3 for bound copies and £2 15s. for unbound, plus postage.

HORSELEY BRIDGE & THOMAS PIGGOTT, LIMITED, of Tipton, have acquired the capital of G. H. Whitehouse & Son, Limited, engineers and machinists of Horseley Heath, Tipton.

## Iron Castings Production at EEC

The English Electric Company, Limited, in their annual review of activities have included a section on iron castings. It states that approximately one-third of the total output of the company's Bradford Foundry has been sold to customers requiring grey iron, Meehanite and nodular-graphite castings. The major industries supplied have been marine and general engineering, and the car industry. During 1961 new layouts and techniques have enabled a considerable increase in foundry efficiency to be made. In particular full advantage of reinforced plastics has been taken to develop light-weight, dimensionally-stable patterns and coreboxes. Detailed development work is being carried out on improvements to moulding methods, and melting equipment to give a large increase in capacity for the production of nodular graphite iron is to be brought into service.

## Scottish Consortium for Poland

A group of four Scottish business men who came back from Poland recently with a substantial number of inquiries for engineering products, report that orders could be won for complete chemical and petrochemical plants, mining and steel equipment—but only if the Scots can overcome fierce international competition in price and delivery. The group were sponsored by the Scottish Council (Development and Industry), and, representing six Scottish engineering firms,* were investigating opportunities for building complete plant on a consortium basis and pinpointing chances for Scottish-made engineering equipment.

As well as the inquiries for complete plants, the group found interest in new products centreing on general engineering items such as components, machine-tools, textile plant, and chemical handling equipment. Next year buyers and technical representatives of Polish organizations will come to Scotland.

* See Report, JOURNAL December 7, p. 723.

## International Apprentice Competition

The City and Guilds of London Institute, 76, Portland Place, London, W.1, announces that it is again providing the necessary administrative and secretarial help for the selection of the British team for the 1962 International Apprentice Competition. Amongst the trades listed for inclusion in the competition are sand moulding and wood patternmaking. Since the competition was started in Spain in 1951, the number of competing countries has increased from two to 11, and British participation, which was six in 1956, last year reached 31. Details are available from the Director (I.A.C.), at the address quoted.

## GKN Offer for Raleigh Works

An offer has been made by Guest, Keen & Nettlefolds, Limited, through its subsidiary, G.K.N. Group Services, Limited, to purchase the Lion works, at Newtown (Montgomery), from Raleigh Industries, Limited. Subject to the completion of contract arrangements, the deal is likely to be concluded early next year. Raleigh announced in June that it had decided to close down the factory at the end of 1961.

Present intentions, state GKN, are to establish at the factory additional manufacturing facilities and every effort will be made to offer, in due course, employment to the maximum number of persons.

## News in Brief

NINETY-ONE EMPLOYEES of Alfred Herbert, Limited, of Coventry, have received presentations in recognition of 25 years continuous service with the firm.

TO COPE with the steadily increasing volume of business in France, Pollard Roulements, the Paris susbidiary of Pollard & Roller Bearing Company, Limited, have acquired substantial additional warehouse facilities consisting of some 2,500 sq. ft. floor space. The warehouse is nearby the offices and showroom of Pollard Roulements at 6, Boulevard Pershing, Paris 17.

MORE THAN 190 MEMBERS and guests attended the Non-Ferrous Club's annual dinner/dance held at Chadwick Manor Hotel, Knowle, Warwickshire, on December 7. At its January luncheon to be held on the third of the month, Sir Ronald Prain will be speaking about "Some Thoughts on Copper Production." For the luncheon meeting, the Club returns to the Queens Hotel, Birmingham.

ON DECEMBER 1, Willson Lathes, Limited, lathe makers, Shay Lane, Ovenden, Halifax, received an order by telephone from a Canadian firm for a general-purpose lathe with instructions that the machine had to be in actual operation in their Newfoundland centre in a week. The lathe—a standard design of machine produced by the firm—was completed, and on December 8 was flown across the Atlantic to be installed.

BRUCE PEEBLES & COMPANY, LIMITED, Edinburgh, have received a £320,000 order from the transmission project group of the Central Electricity Generating Board for two outdoor 60 MVAr 13 kv 1,000-r.p.m. synchronous condensers. The condensers will be installed initially at West Weybridge. Of special design, their complete erection on site will be possible without using an overhead crane. Heavy excavation work and elaborate foundations will not be necessary.

THE RE-ARRANGEMENT of the layout of the British Pavilion at next year's Leipzig Spring Fair, to be held from March 4 to 13, will provide an extra 1,836 ft. of stand space, bringing the total to 15,498 sq. ft. Improved amenities include a new lounge which will be available to British exhibitors for entertaining clients. These arrangements have been made by British Overseas Fairs, Limited, who co-ordinate British exhibitors in the Pavilion on behalf of the Federation of Britsh Industries.

ELEVEN MEN AND FOUR WOMEN in the employ of George Salter & Company, Limited, West Bromwich, have been presented with long-service awards by Mr. R. P. S. Bache, the company's chairman and managing director. Three of them, Mr. E. Parker, aged 71 (55 years' service), Mr. W. Lane, 67 (54 years' service), and Mr. H. Bellmore, aged 63 (50 years' service), received cheques. Clocks, watches, and barometers were presented to the remaining 12 employees each of whom has completed 25 years' service.

FROM JANUARY 1, the Michigan range of tractor shovels, dozers and motorized scrapers will be sold and serviced in 50 counties throughout England and Wales by Jack Olding & Company, Limited, Hatfield, Herts. Servicing and spares will be organized through six strategically located depots. The arrangement excepts Northumberland, Cumberland, Westmorland and Durham, where sales and service of this equipment remains in the hands of the Scottish Land Development Corporation, who are also the distributors in Scotland.

EXPORTS OF THE COLCHESTER LATHE COMPANY, LIMITED (one of the 600 Group of Companies), have reached a new record, and now amount to over 60 per cent. of total production. The annual output is currently in excess of 3,500 machines and work is now in progress on extensions to the Colchester factory, which, when complete, will substantially increase this figure. These lathes, it is stated, are used extensively in technical schools and machine-shops in over 100 countries.

A COMPANY controlled by Japanese interests, named Iron & Minerals Development Company (Private), Limited, has been registered in Southern Rhodesia, reports Barclays Bank D.C.O. from Salisbury. It is reported that the new company will develop iron-ore claims near Hunters Road and it is expected that some 10,000 to 12,000 tons of iron ore may be railed monthly when the mine is in operation. The Bank adds that delegates from the Kawasaki Steel Corporation, Japan, have also visited the Colony in connection with that concern's possible participation in the exploitation of local iron-ore deposits.

N.C.K.-RAPIER, LIMITED, selling organization for the excavators and cranes made by Newton Chambers & Company, Limited, and its associate Ransomes & Rapier, Limited, have received an order worth over £260,000 for 15 crawler-mounted draglines and three truck-mounted cranes for the East Pakistan Water and Power Development Authority. They are being made at the Thorncliffe Works, Sheffield, of Newton Chambers. It is believed that the successful performance of eight NCK-Rapier draglines sold to West Pakistan at the beginning of the year for fertilization projects in the Punjab has helped in securing the new order.

AMONG WEST MIDLANDS FACTORIES visited by members of the Polish technical delegation to Britain on their two-day tour of the region on December 7-8, were W. & T. Avery, Limited, Birmingham, Delta Metal Company, Limited, the Metals Division of Imperial Chemical Industries, Limited, Incandescent Heat Company, Limited, at Smethwick, and Wellman Smith Owen & Company, Limited at Darlaston. It was stated by a spokesman for the London Chamber of Commerce, joint host to the delegation with the Federation of British Industries, that the big expansion by Poland in iron and steel production meant that much additional plant and equipment was required. The Polish authorities, he said, are anxious to place orders for such equipment in Britain wherever possible.

## Obituary

The death has occurred, at the age of 93, of Mr. JOHN ARTHUR FROST, formerly chairman and managing director of Pickersgill & Frost, Limited, of the Star Foundry, Langley Mill, Notts. In 1891, he joined his father in a business of ironfounders, and in 1913 became chairman and managing director of the above company.

The French Press announces the death of Mr. HENRI MAGDILENAT at the advanced age of 86. He was the chairman of the Société de Rosières, a highly-mechanized foundry making cooking and heating stoves. President of the *Association Technique* in 1933 and an orator of outstanding merit, he was a captain in the engineering section of the French army during the 1914-18 war and received several decorations, including the *Rosette* of the Legion of Honour (military).

## Translation Services

From amongst the most recently published lists of translations available from the Iron & Steel Institute (4, Grosvenor Gardens, London, S.W.1), the following have been selected as being of interest to founders. The price quoted is that for single copies, postage extra, there being reductions for quantities ordered. Readers writing for translations, or for further information, should mention this JOURNAL when doing so.

BISI 2248 INTENSIFICATION OF DEGREASING AND PICKLING PROCESSES BY ULTRASONICS. Agranat, B. L. (From Russian.) *Lekokras. Materialy i ikh Primenenie*, 1960 (1), 58-62. (£4 15s.) The effect of vibrations of various frequencies and intensities was compared with that of mechanical stirring and static submersion. Pickling solutions used were white spirit, detergent, $H_2SO_4$ and HCl. Rust and high-temperature scale were removed in a much shorter time and at lower temperature. Consumption of pickling acid was reduced.

BISI 2362 EXPERIENCES IN TREATING THE SURFACE OF SEMI-FINISHED PRODUCTS OF ALLOY STEELS BY FLAME GOUGING AND GRINDING. Geipel, H. (From German.) *Stahl Eisen*, 1961, *81*, June 8, 787-794. (£5 5s.) Surface treatment of semi-finished steel products with particular reference to flat-rolled products. The paper deals with hot-flame-gouging of blooms; depth of penetration speed of flame and losses; oxygen-metal factor; powder gouging; cold flame-gouging machine for slabs; grinding of semi-finished products; effect of peripheral speed and grinding-wheel pressure on the volume of metal removed; wear factor when using bakelite-bonded grinding wheels; and the cost of various flame-gouging and grinding processes.

BISI 2399 DIRECT OBSERVATION OF NON-METALLIC INCLUSIONS IN STEEL WITH AN ELECTRON MICROSCOPE. Akutagawa, T., *et al.* (From Japanese.) *Tetsu-to-Hagane*, 1957, *43*, Nov., 1222-1228. (£9 10s.) The extraction replica technique used an evaporated carbon film. New techniques were employed for cleaning the surface of the etched specimen, evaporation and separation. TiN, FeS, $SiO_2$, MnS and other inclusions were examined. (16 refs.) *JISI* abstract 1959, Feb., 212c.)

BISI 2461 STEELS AND CAST IRONS WITH A HIGH-BORON CONTENT. Vrtel, J. (From Czech.) *Hutn. Listy* (Prague), 1960, *15* (12), 945-950. (£6 5s.) Laboratory tests were carried out to ascertain the effect of B on steels and cast-irons. B contents reaching 1.8 per cent. in cast-iron and 5.5 per cent. in the steels. The influence of B on the physical and mechanical properties of the alloys was studied, and the nature of the phases formed was ascertained. In cast-irons, B dissolves in the cementite, or forms borocarbides $FE_{23}(C, B)_6$ depending upon the B:C ratio. The stable boride $Fe_2B$ is formed in steels if boron is present in excess of 1 per cent. It was not found possible to dissolve this phase in the alpha-iron; consequently B additions exceeding 1 per cent. are unlikely to lead to improvements of the mechanical properties of steels or cast-irons. The effect of casting and heat-treatment on these boron alloys was studied. (*JISI* abstract.)

### Translations in Course of Preparation

BISI 2537 REACTIONS CAUSING FOAMING OF SLAGS. (With discussions.) Fellcht, K. (From German.) *Metallurgie u. Giessereitechnik*, 1955, *5*, Mar., 85-102.

BISI 2538 ABRASION RESISTANCE OF AUSTENITIC MANGANESE STEELS. Muratov, F. J., and T. E. Norman. (From French.) *Rev. Mét.*, 1951, *58*, June, 489-506.

BISI 2543 IRON AND STEEL CONSUMPTION IN THE AUTOMOBILE INDUSTRY. Hansen, H. H. (From German.) *Stahl Eisen*, 1961, *81*, Sept. 14, 1395-1398.

BISI 2549 RELATION BETWEEN ETCHING OF STEEL SPECIMENS, PLASTIC REPLICAS AND MICROGRAPHS. Schrader A. (From German.) *Zeitschrift Wissenschaftlicher Mikroskopie.*, 1952, 60, 309-316.

### Other People's Translations

The initials OTS, etc., stand for the organization to which enquiries for the following translations should be made, quoting the reference numbers. Addresses are given at the end of the list.

OTS 60-41357 PRINCIPAL METHODS AND APPARATUS FOR INVESTIGATING OXIDATION PROCESSES IN METAL AND ALLOYS. Ignatov, D. V. *Dokladu Inst. Met. Imeni A.A. Baikov*, No. 5, Production Metallurgy, Physical Metallurgy and Physicochemical Methods of Research, 1960, 202-237. (In ISI Library, shelf mark TMS 562.)

USAEC-tr-4202 VISCOSITY OF LIQUID METALS. Korol'kov, A. M. *Izvest. Akad. Nauk, Otdel. Tekh. Nauk, Met. i Toplivo*, 1959 (5), 123-6. (In ISI Library, shelf mark TMS 571.)

BCIRA 1019 NEW ANHYDROUS COATING FOR MOULDS AND CORES. Petrzela, L. *Slévarénstri*, 1959, 7, Dec., 513-518.

USAEC-tr-4231 PROBLEM OF USING TITANIUM TO STABILIZE ANTI-CORROSION STEEL 18/9 FOR CASTINGS. Pospisil, R., and R. Stefec. *Hutnicke Listy*, 9 (4), 218-225.

BCIRA 1016 FATIGUE RESISTANCE OF CAST IRON AS A FUNCTION OF ITS STRUCTURE AND CONDITIONS OF ALTERNATING STRESS. Serensen, S. V. *Mémoires Scientifiques de la Revue de Métallurgie*, 1959, *56*, Dec., 713-720.

BCIRA 1012 USE OF EXOTHERMIC SLEEVES FOR HEATING OF FEEDER-HEADS ON A STEEL-ARMATURE CASTING. Sokolovskii, L. O. *Lit. Proizv.*, 1960 (3), March, p. 32.

BCIRA 1014 STUDY OF HIGH CHROMIUM MARTENSITIC CAST IRON. Vilain, A., and J. Marlot. *Metallurgie*, 1959, 1 (7), 183-191.

OTS 61-21246 JPRS: 6804-D ALL UNION CONFERENCE ON THE INTRODUCTION OF RADIOACTIVE ISOTOPES AND NUCLEAR RADIATION INTO THE NATIONAL ECONOMY OF THE USSR. *Atomnaya Energiya*, 1960, *9* (3). (In ISI Library, shelf mark TMS 610.)
USE OF RADIOACTIVE ISOTOPES AND NUCLEAR RADIATION IN METALLURGY. Gruzin, P. L., and Yu. F. Babikova. 223-225.

**Symbols for Sources of Translations:** US AEC: Office of Technical Services, Department of Commerce, Washington, 25, D.C., USA. BCIRA: British Cast Iron Research Association, Bordesley Hall, Alvechurch, Birmingham. OTS: Office of Technical Services, Department of Commerce, Washington, 25, D.C., USA.

## Lead Mining in Yorkshire

Lead mining in the Yorkshire Pennines had its peak production in 1860, when the annual output was 10,665 tons, said Dr. Arthur Raistrick, the Yorkshire archaeologist, when he outlined the history of the industry there, to the Yorkshire Archaeological Society in Leeds on December 2. The last mines were closed 40 years ago. He said that smelting began in an elementary way when charcoal or peat was used in numerous small furnaces built on the sites where the lead was mined. Examination of pigs of lead from the period indicated that as much as two days' work might have gone into the production of one pig. It was the 16th century before German and other continental methods were introduced, and mining and smelting began to develop as separate crafts and output was increased. The requirement of lead for buildings in medieval times resulted in the conscription of men to work in the lead workings. This developed into the growing up of a specialized community which ultimately received authority to establish its own courts to settle mining disputes and to establish laws.

Dr. Raistrick said that one of the largest mines was at Hebden Ghyl. This was worked for 30 years and in order to deal with the increasing amounts of ore being mined, a large smelting works was built on Grassington Moor.

The importation of cheaper lead from America and Spain led to a catastrophic decline in the Yorkshire output after the record year of 1860. In 1855 there were 160 mines registered, but by 1885 the number had been reduced to 80, and by 1920, there were only five.

## Latest Foundry Statistics

*Ironfounding:* Council of Ironfoundry Associations states the following number of ironfoundry workers were employed in the UK during the week ending September 30, 1961: 120,325 males and 8,921 females, making a total of 129,246. At this level, employment was 145 fewer than a month earlier and 2,057 fewer than a year ago.

*Company Meeting*

# Hale & Hale (Tipton)

## BENEFITS FROM IMPROVED PRODUCTION FACILITIES

The 25th annual general meeting of Hale & Hale (Tipton), Limited, was held on December 20 at Dudley, MR. R. C. LEPPINGTON (the chairman) presiding.

The following is an extract from his circulated statement:

**Parent Company**—During the trading year under review we have gradually felt the benefit of our improved production facilities of both melting and moulding. This has enabled us to keep costs fairly stable in spite of wage and raw material increases.

There have been fluctuations in orders received during the year, largely due to the indirect effect of the recession in the car industry, but we have been able to maintain full-time working and with the introduction of new business the outlook for the future appears favourable. The development of our Tubeclamps Department, along with other advances in the general manufacturing field, is going forward satisfactorily and will give wider scope to our activities.

We are also developing improved methods of casting production which will be supplementary to existing methods, and plant for this purpose is now on order and will be working later this year; and there will be further expenditure in improving the finishing side of our business to bring it more in line with modern requirements.

Your directors are conscious of the necessity of maintaining the plant in good condition to ensure its keeping pace with the ever changing pattern of industry.

### Subsidiaries

**Chatwins, Limited,** had a disappointing trading year, due in no small measure to the growing effect of the Clean Air Act, which although it resulted in increased sales of our smaller inset fires, sharply reduced the demand for our larger combination grates, etc. This marked change in our sales position, coupled with intensified competition, and aggravated by an acute labour shortage, resulted in a substantial trading loss. Steps have been taken to strengthen the trading position of this company.

**J. & J. Whitehouse (Tipton), Limited,** continue to make a useful profit from a traditional, although gradually declining market.

**Hale Enamellers, Limited,** although making a small profit, suffered a set-back due to the decline in demand for vitreous enamelling of cast iron solid fuel appliances. I am pleased to say, however, that with the introduction of new plant, we are entering the field of sheet steel vitreous enamelling, and already the high quality of our process is attracting attention.

In regard to **J. Wakefield & Sons, Limited,** as I remarked last year, steps were being taken to diversify this company's activities, and I am pleased to report a useful profit was made due to such measures. The Company is now producing Domestic Electrical Appliances under the trade name of "Enchantress," and these goods are being marketed through Chatwins, Limited. At present a heavy order-book is held, and I feel we can anticipate a satisfactory trading year ahead.

### Group Accounts

**Profit and Loss Accounts:** As previously mentioned Chatwins, Limited, has had a disappointing year, and including trading results of the Subsidiaries, the Group Trading Profit for the year ended 4th August, 1961, amounts to £95,615, as compared with £74,547 for the previous year. After deductions for Directors' Emoluments, Depreciation, and Obsolescence, etc., totalling £56,054, the Profit before taxation amounts to £39,606, an increase of £13,452 on last year.

The charge for Taxation takes £9,722, leaving a Net Profit of £29,884, against £19,680, an improvement of £10,204. After deducting Dividends and Appropriations the balance carried forward is £27,455.

The report and accounts were adopted.

## New College planned for Dumfermline

Because of the inadequacy of accommodation at Lauder Technical College, Dunfermline, Fife, and the urgent need to expand further education facilities, Fife Education Committee have agreed to provide new college accommodation of 75 rooms on a new site.

A report to the Committee stated that in September last year the county architect had indicated that, to provide the accommodation required partly by new building and partly by adapting the only two of the existing buildings which could be brought into the scheme, would be "a difficult, costly, and lengthy process." The result would not be "entirely satisfactory." Development on a new site would be cheaper and the final building much better.

A rough estimate of the cost of building on a new site was £650,000. In addition, a sum of perhaps £300,000—at present prices—would be required for furniture and equipment. The committee agreed that negotiations be opened immediately with Dunfermline Town Council for a suitable site.

## GKN/Delta Metal Talks

Conversations are taking place between Guest, Keen & Nettlefolds, Limited, and the Delta Metal Company, Limited, for the furtherance of their "mutual interests" with regard to their respective subsidiaries, United Non-Ferrous Metals, Limited, and Davis & Timmins, Limited. No material changes are envisaged by the two boards, either in the management or general trading policies of either of these two companies.

United Non-Ferrous Metals manufactures metal rods, and Davis & Timmins specializes in screws, bolts and nuts. In a share-exchange offer worth about £6,000,000 last June, Delta Metal acquired the outstanding 80 per cent. of the share capital of Davis & Timmins not then held by it. A further statement is expected shortly.

### Award for Production Engineers in India

Made possible by the generosity of Sir Walter Puckey, the Council of the Institution of Production Engineers has established a fund to enable an annual award to the value of £50 to be made for the most significant contribution to production engineering in India. Sir Walter, who is chairman of Management Selection, Limited, and a director of Black & Decker, Limited, and a number of other companies, is a past-president of IPE and a well-known production engineer.

Selection of candidates, who must be of Indian nationality but not necessarily members of IPE, will be made from applications or recommendations to the Indian Council.

# *To all our Friends—*

Seasonal Greetings and Best Wishes for a Happy and Prosperous New Year

*From*

**F. & M. SUPPLIES LTD.**

4, BROAD STREET PLACE, LONDON, E.C.2.

TELEPHONE: LONDON WALL 7222 (4 lines)

Cables: Foundrimet, London, Telegrams: Foundrimet, Telex, London.

FACTORY: CONCORDIA WORKS, LONDON, E.14

# Raw Material Markets

## Iron and Steel

No change in the position can be expected this side of the New Year, and without exception, producers of all types of castings could increase outputs considerably. Overall outputs of castings are maintained at fairly reasonable levels, but most establishments are working well below capacity and many on a shortened working week.

The general decline in consumption of high-duty castings continues in many trades, in particular the motor-vehicle industry; and in consequence outputs of castings by the engineering and speciality foundries which cater for them are reduced proportionately. From other trades demands for high-quality castings are fair, but generally the foundries are anxious to obtain more work, particularly to cover forward bookings. Railways, steelworks, and collieries are using only moderate tonnages of castings, but from the heavy engineering and electrical industry and machine tool trade reasonably good quantities are being absorbed.

The light foundries connected with the domestic utensil trade are benefiting by improved demands for castings, but due no doubt to seasonal influences and the restriction in building, demands for builders' castings are moderate. Jobbing, and textile foundries are in need of more work and the malleable iron foundries have capacity to spare.

Plentiful supplies of all grades of pig-iron are available from stock and current production, although the number of furnaces in blast has been reduced and many are working below capacity. Demand from the steelworks for basic pig-iron is easily met for both consumption and stock requirements. Fairly substantial consignments of this iron continue to be shipped overseas. The foundries are also well provided with all the grades of iron they use. The low-phosphorus irons are in biggest demand, and from the engineering and speciality foundries fairly good tonnages of hematite and some refined irons are also being called for. High-phosphorus irons are plentiful, but the demand is only moderate

The foundries are well provided with most grades of scrap, and no difficulty is experienced in obtaining supplies of foundry coke, ganister, limestone, and firebricks.

Most of the re-rollers continue short of work, and only moderate demands are being made for their products. Although they have reduced the number of shifts, difficulty is experienced in finding sufficient orders for small bars, light sections, strip, etc., to make up rollings. Reinforcing rods are in fairly good demand.

The call from the re-rollers for steel semis is moderate and much larger quantities of mild-steel billets, etc., could be supplied. The availability of carbon and alloy steels is also much easier. Arisings at the steelworks of defectives and crops are now more difficult to dispose of.

## Non-ferrous Metals

Partly because of the talk of a cease-fire in Katanga and in the absence of new developments in the Chuquicamata wage negotiations, copper lost fresh ground. There was a gradual decline in price on the London Metal Exchange. The New York market was also dull.

The recovery of tin in Singapore prompted initial marking up in values, but the continued lack of demand has given an overall dull tone to the market. Despite the setback in copper, business in lead has been fairly steady and orders, though small, have been well balanced.

Zinc prices remain firm but business is sluggish and confined to a minimum.

# Increases of Capital

DOWTY GROUP, LIMITED, Cheltenham, increased by £500,000 in 10s. shares, beyond the registered capital of £6,000,000.

BEDCO, LIMITED, ironfounders, etc., of Harpenden, increased by £14,000 in £1 ordinary shares, beyond the registered capital of £16,000.

INCANDESCENT HEAT COMPANY, LIMITED, Smethwick, increased by £160,000 in 4s. ordinary shares, beyond the registered capital of £500,000.

FOLLSAIN, LIMITED, smelters, ironmasters, etc., of Rugby, increased by £45,000 in 4s. ordinary shares, beyond the registered capital of £355,000.

RELIANCE FOUNDRY & ENGINEERING COMPANY, LIMITED, London, S.E.14, increased by £38,000 in £1 shares, beyond the registered capital of £12,000.

BROCKMOOR FOUNDRY COMPANY, LIMITED, Brierley Hill (Staffs), increased by £10,000 in £1 preference shares, beyond the registered capital of £60,000.

HARPER ENGINEERING & ELECTRONICS, LIMITED, London, E.C.2, increased by £1,250,000 in 1s. ordinary shares, beyond the registered capital of £1,250,000.

WHITEHEAD IRON & STEEL COMPANY, LIMITED, Newport (Mon), increased by £1,000,000 in £1 ordinary shares, beyond the registered capital of £2,000,000.

TONKS (BIRMINGHAM), LIMITED, brassfounders, etc., of Birmingham, increased by £100,000 in 5s. unclassified shares, beyond the registered capital of £200,000.

WARNER SWASEY ASQUITH, LIMITED, machine-tool manufacturers, etc., of Halifax, increased by £350,000 in 175,000 "A" and 175,000 "B" shares of £1 each, beyond the registered capital of £650,000.

LANDIS MACHINE-MAIDEN, LIMITED, founders, engineers, etc., of Hyde (Ches), increased by £100,000 in 80,000 "A" ordinary and 20,000 "B" ordinary shares of £1 each, beyond the registered capital of £100,000.

F. PARKIN & SONS, LIMITED, iron and brass founders, engineers, etc., of Exeter, increased by £15,000 in 13,061 7 per cent. cumulative preference, 491 ordinary and 848 unclassified shares of £1 each, beyond the registered capital of £20,000.

# Recent Wills

SHAW, JAMES, former chairman of Allied Ironfounders, Limited ... ... ... ... ... ... ... £16,437

PICKLES, R. H., director of John Pickles & Son (Engineers), Limited, Hebden Bridge (Yorks) ... ... £23,907

WILKINSON, GRANVILLE, managing director of E. & W. H. Haley, Limited, ironfounders, of Bradford (Yorks) ... ... ... ... ... ... ... ... £4,218

BARTRAM, G. H., director for 37 years of the Sunderland shipbuilding firm of Bartram & Sons, Limited ... ... ... ... ... ... ... ... £32,896

JONES, L. M., managing director of Samuel Jones & Company, Limited, engineers, and non-ferrous founders, of London, S.E.15 ... ... ... ... ... £81,790

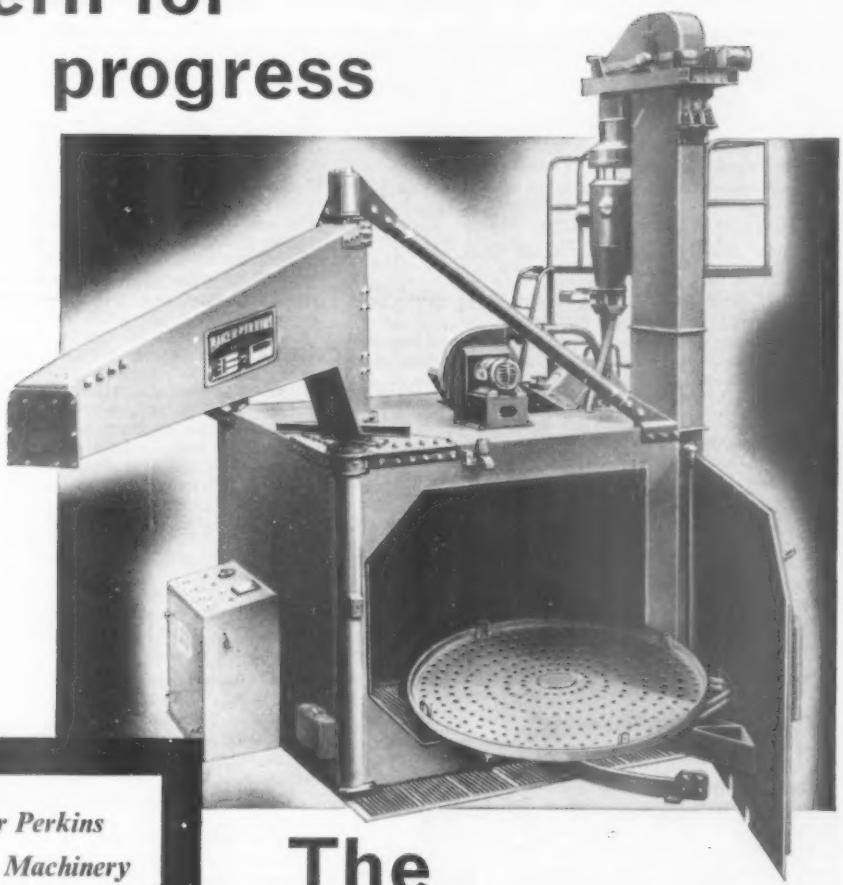
OGLE, ALFRED, formerly managing director of G. C. Ogle & Sons, Limited, agricultural engineers and ironfounders, of Ripley, near Derby ... ... £28,907

MATHER, J. C., deputy chairman, and formerly chairman of Cammell Laird & Company, Limited, and a director of several other companies ... ... £39,654

CRYER, L. H., secretary of the National Federation of Scrap Iron, Steel, and Metal Merchants, and for many years with the Ministry of Supply ... £6,159

THE ENGINEERING DIVISION HEADQUARTERS of the Distillers Company, Limited, until recently at Devonshire House, Piccadilly, has now been transferred to a new building, Enford House, at 139-151, Marylebone Road, London, N.W.1.

# pattern for progress



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# Current Prices of Iron, Steel, and Non-ferrous Metals

**(Basis prices, delivered unless otherwise stated. Prices following side headings marked* are subject to an increase of 1 per cent. under Iron and Steel Board Price Determination, 1961, No. 2.)**

December 20, 1961

## PIG-IRON

* **Foundry Iron.**—No. 3 IRON, CLASS 2, 10-ton lots or over, Middlesbrough, £21 17s. 0d.; Birmingham, £21 9s. 3d.

* **Low-phosphorus Iron.**—Over 0.10 to 0.40 per cent. P, 10-ton lots or over, £23 5s. 0d., delivered Birmingham; £23 10s. 0d., delivered Grangemouth.

**Cylinder and Refined Irons.**—North Zone, £25 6s. 6d.; South Zone, £25 9s. 0d.

**Refined Malleable.**—P, 0.10 per cent. max.; North Zone, £26 6s. 6d.; South Zone, £26 9s. 0d.

* **Hematite.**—Si less than 2 per cent, S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over: N.-E. of England (local iron), £23 19s. 0d.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 9s. 0d.; Birmingham, £25 13s. 0d.; South Wales (Welsh iron), £23 19s. 0d.

* **Basic Pig-iron.**—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

## FERRO-ALLOYS

*(per ton unless otherwise stated, delivered)*

**Ferro-Silicon** (6-ton lots and over).—45 per cent. Si, £45 0s. 0d. to £48 0s. 0d., scale 15s. 0d. per unit, lumpy, 75 per cent. Si, £62 10s. 0d. to £66 10s. 0d., scale 15s. 0d. per unit, lumpy.

**Ferro-vanadium.**—50/60 per cent., 22s. 6d. per lb. of V.

**Ferro-molybdenum.**—65/70 per cent., carbon-free, 14s.1d. per lb. of Mo.

**Ferro-titanium.**—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

**Ferro-tungsten.**—80/85 per cent., 9s. 1d. per lb. of W.

**Tungsten Metal Powder.**—98/99 per cent., 12s. 1d. per lb. of W.

**Ferro-chrome** (6-ton lots and over, lumpy).—4/6 per cent. C, £80 10s. 0d. to £84 10s. 0d., basis 60 per cent. Cr scale 27s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £79 0s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale, 27s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr.; 0.10 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.06 per cent. C,* 1s. 10½d. to 2s. 1d. per lb. Cr. * Average 68-70 per cent.

**Metallic Chromium.**—98/99 per cent., 6s. 9d. per lb.

**Metallic Manganese.**—94/96 per cent., carbon-free, £275 0s. 0d.; 96/98 per cent., £285 0s. 0d.

**Ferro-columbium.**—65/67 per cent. Cb + Ta, 19s. 0d. per lb., Cb + Ta.

**Ferro-manganese** (Standard).—78 per cent., £58 10s. 0d.

## SEMI-FINISHED STEEL

* **Re-rolling Billets, Blooms, and Slabs.**—BASIC: Soft u.t., 100 tons and over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 100 tons and over, £32 5s. 6d.; hard (0.41 to 0.60 per cent. C), 50 tons and over, £33 17s. 0d.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting, 50 tons and over, £35 4s. 6d. SIEMENS MARTIN ACID (50 tons and over): Up 0.25 per cent. C; £40 11s. 0d.; silico-manganese, £43 4s. 0

* **Billets, Blooms, and Slabs for Forging and for Stamping** 50 tons and over).—BASIC: Soft, up to 0.33 per cent. C £37 0s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £38 2s. 6d.; acid, up to 0.25 per cent. C, £41 14s. 0d.

## FINISHED STEEL

* **Heavy Plates and Sections** (50 tons and over).—Ship plate (N.-E. Coast), £40 7s. 0d.; boiler plates (N.-E. Coast), £42 17s. 0d.; floor plates (N.-E. Coast), £41 16s. 0d.; angles (N.-E. Coast), £38 1s. 6d.; joists (N.-E. Coast), £37 17s. 6d.

* **Small Bars, Sheets, etc.**—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 6d.; under 4 tons to 2 tons, £41 3s. 6d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 4s. 0d.

**Alloy Steel Bars.**—1 in. dia. and up: Nickel, £67 16s. 0d.; nickel-chrome, £100 18s. 0d.; nickel-chrome-molybdenum, £113 11s. 0d., in lots of 25 tons and over.

## NON-FERROUS METALS

**Copper.**—Cash, £230 10s. 0d. to £230 15s. 0d.; three months, £231 0s. 0d. to £231 5s. 0d.; settlement, £230 15s. 0d.

**Copper, Tubes, etc.**—Solid-drawn tubes, 2s. 2½d. per lb. rods, 247s. 6d. per cwt. basis; 20 s.w.g., 282s. 0d. per cwt.

**Tin.**—Cash, £952 0s. 0d. to £952 10s. 0d.; three months £962 0s. 0d. to £963 0s. 0d.; settlement, £952 10s. 0d.

**Lead (Refined Pig).**—Second half December, £60 12s. 6d. to £60 15s. 0d.; second half March £61 15s. 0d. to £62 0s. 0d. settlement, £60 15s. 0d.

**Zinc.**—Second half December, £71 15s. 0d. to £72 5s. 0d.; second half March, £73 0s. 0d. to £73 5s. 0d.; settlement; £72 5s. 0d.

**Zinc Sheets etc.**—Sheets, 15g. and thicker, all English destinations, £109 12s. 6d., rolled zinc (boiler plates), all English destinations, £107 7s. 6d.; zinc oxide (Red Seal); d/d buyers' premises, £85 0s. 0d.

**Brass Tubes, etc.**—Solid-drawn tubes 1s. 9½d. per lb.; sheets to 10 w.g., 198s. 6d. per cwt.; wire, 2s. 8½d.; rolled metal, 198s. 6d. per cwt.

**Brass (Brazing).**—BS1400, SCB2, £177; SCB3, £174.

**Brass (High Tensile).**—BS1400, HTB1, £193; HTB2 £213; HTB3, £227.

**Gunmetal.**—BS1400, LG2, £212; LG3, £223; G1, 1½% £279; G1 ½% £295.

**Phosphor Bronze.**—BS1400, PB1 (AID released), £315; PB4 £301; BS1400, 90/10/1%, £301.

**Leaded Phosphor Bronze.**—BS1400, LPB1, £236.

**Phosphor Bronze Strip, etc.**—Strip, 303s. 3d. per cwt.; wire, 4s. 2½d. per lb.; rods, 3s. 5d.; tubes, 3s. 5d.; chill cast bars, solids 3s. 5½d.; cored, 3s. 6½d. (CHARLES CLIFFORD LIMITED).

**Nickel Silver, etc.**—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 11½d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 4½d.; special quality turning rod, 10 per cent., ⅛ in. dia., in straight lengths, 4s. 3½d. All prices are net.

**Other Metals.**—Magnesium, ingots, 2s. 2½d. to 2s. 3d. per lb.; Antimony, English, 99 per cent., £230 0s. 0d. Quicksilver, ex-warehouse, £59 0s. 0d. Nickel, £660 0s. 0d. Aluminium, ingots, £186 0s. 0d.; aluminium bronze (BS1400), AB1, £240 AB2, £247.

# Company News

**Hadfields/Escher Wyss Deal**

Offer of £1,260,000 by Escher Wyss, of Zurich, for 60 per cent. of the £600,000 ordinary capital of the board and paper-making machinery manufacturing subsidiary, Millspaugh, Limited, has been accepted by the board of Hadfields, Limited. Hadfields will continue to hold one third of the Millspaugh stock, and will be represented on the board. As part of the agreement, Hadfields will receive the repayment from Millspaugh, within the next 12 months, of all the £1,260,232 outstanding balance of moneys loaned that company in recent years.

Sir Peter Roberts, chairman of Hadfields, in a letter to shareholders, explains that the problem of providing sufficient additional funds adequate to finance the development of both Hadfields and Millspaugh has been of concern to the board, and in the light of this the offer of Escher Wyss had been accepted. It is hoped that by combining the experience and know-how of the three groups that the future development of Millspaugh will be materially strengthened for the benefit of all the interested parties. Hadfields cash resources will be increased by about £2,400,000, but an overall capital loss of some £320,000 has to be borne, Sir Peter says.

In parallel with these negotiations, agreement has been reached, subject to Treasury approval, for the Black-Clawson Company, of the US, to purchase certain Canadian manufacturing interests which, so far as Millspaugh is concerned, have shown a bad past experience. Arrangements will be made for representation to be maintained in Canada by both Hadfields and Millspaugh. Overall, says Sir Peter, cash resources will be increased by £2,635,000 as a result of all the transactions.

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ASSOCIATED ENGINEERING, LIMITED—Net profit, after tax of £1,355,923 (£1,787,227), is down at £1,496,189 (£1,882,836). Final dividend is 8¼ per cent., making a 13¼ per cent. total. The same equivalent, adjusting for a 50 per cent. scrip issue, was paid last year.

STAVELEY INDUSTRIES, LIMITED—Mr. John P. Hunt, the chairman, assured shareholders that the board felt "fully justified" in maintaining the dividend. It could well be further maintained and possibly increased in the future, he said. Profits for the first four months of the current year compared "very well."

BRIGHTSIDE ENGINEERING HOLDINGS, LIMITED—Group surplus of £1,011,502 in the year ended September 30, 1961, compares with £1,061,113, and after tax of £539,099 (£543,352), there is a net balance of £472,403 against £517,761. Dividend of 20 per cent. is repeated with a final of 15 per cent.

WHITEHEAD IRON & STEEL COMPANY, LIMITED—The final dividend of 8¼ per cent. for the year ended September 30, 1961, makes a total of 15 per cent. on capital doubled by a scrip issue. A similar equivalent was paid for 1959-60. Group profits contracted to £1,053,624 (£1,446,830) and, after tax of £565,298 (£715,683), the net balance is £488,326 (£731,147).

FAIRBAIRN LAWSON COMBE BARBOUR, LIMITED, textile machinery manufacturers, etc., of Leeds—The chairman, Mr. W. Walker, announces reorganization of capital, and proposals providing for converting the preference and preferred ordinary shares into cumulative preference. It is also intended to propose arrangements for additional finance to deal with expansion plans.

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MOULDING SAND
REFRACTORIES

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*(per ton unless otherwise stated, delivered)*

**Ferro-Silicon** (6-ton lots and over).—45 per cent. Si, £45 0s. 0d. to £48 0s. 0d., scale 15s. 0d. per unit, lumpy, 75 per cent. Si, £62 10s. 0d. to £66 10s. 0d., scale 1.5s. 0d. per unit, lumpy.

**Ferro-vanadium.**—50/60 per cent., 22s. 6d. per lb. of V.

**Ferro-molybdenum.**—65/70 per cent., carbon-free, 14s.1d. per lb. of Mo.

**Ferro-titanium.**—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

**Ferro-tungsten.**—80/85 per cent., 9s. 1d. per lb. of W.

**Tungsten Metal Powder.**—98/99 per cent., 12s. 1d. per lb. of W.

**Ferro-chrome** (6-ton lots and over, lumpy).—4/6 per cent. C, £80 10s. 0d. to £84 10s. 0d., basis 60 per cent. Cr scale 27s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £79 0s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale, 27s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr.; 0.10 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.06 per cent. C,* 1s. 10½d. to 2s. 1d. per lb. Cr. * Average 68-70 per cent.

**Metallic Chromium.**—98/99 per cent., 6s. 9d. per lb.

**Metallic Manganese.**—94/96 per cent., carbon-free, £275 0s. 0d.; 96/98 per cent., £285 0s. 0d.

**Ferro-columbium.**—65/67 per cent. Cb + Ta, 19s. 0d. per lb., Cb + Ta.

**Ferro-manganese** (Standard).—78 per cent., £58 10s. 0d.

## SEMI-FINISHED STEEL

* **Re-rolling Billets, Blooms, and Slabs.**—BASIC: Soft u.t., 100 tons and over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 100 tons and over, £32 5s. 6d.; hard (0.41 to 0.60 per cent. C), 50 tons and over, £33 17s. 0d.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting, 50 tons and over, £35 4s. 6d. SIEMENS MARTIN ACID (50 tons and over): Up 0.25 per cent. C; £40 11s. 0d.; silico-manganese, £43 4s. 0

* **Billets, Blooms, and Slabs for Forging and for Stamping** 50 tons and over).—BASIC: Soft, up to 0.33 per cent. C £37 0s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £38 2s. 6d.; acid, up to 0.25 per cent. C, £41 14s. 0d.

## FINISHED STEEL

* **Heavy Plates and Sections** (50 tons and over).—Ship plate (N.-E. Coast), £40 7s. 0d.; boiler plates (N.-E. Coast), £42 17s. 0d.; floor plates (N.-E. Coast), £41 16s. 0d.; angles (N.-E. Coast), £38 1s. 6d.; joists (N.-E. Coast), £37 17s. 6d.

* **Small Bars, Sheets, etc.**—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 6d.; under 4 tons to 2 tons, £41 3s. 6d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 4s. 0d.

**Alloy Steel Bars.**—1 in. dia. and up: Nickel, £67 16s. 0d.; nickel-chrome, £100 18s. 0d.; nickel-chrome-molybdenum, £113 11s. 0d., in lots of 25 tons and over.

## NON-FERROUS METALS

**Copper.**—Cash, £230 10s. 0d. to £230 15s. 0d.; three months, £231 0s. 0d. to £231 5s. 0d.; settlement, £230 15s. 0d.

**Copper, Tubes, etc.**—Solid-drawn tubes, 2s. 2¾d. per lb. rods, 247s. 6d. per cwt. basis; 20 s.w.g., 282s. 0d. per cwt.

**Tin.**—Cash, £952 0s. 0d. to £952 10s. 0d.; three months £962 0s. 0d. to £963 0s. 0d.; settlement, £952 10s. 0d.

**Lead (Refined Pig).**—Second half December, £60 12s. 6d. to £60 15s. 0d.; second half March £61 15s. 0d. to £62 0s. 0d. settlement, £60 15s. 0d.

**Zinc.**—Second half December, £71 15s. 0d. to £72 5s. 0d.; second half March, £73 0s. 0d. to £73 5s. 0d.; settlement; £72 5s. 0d.

**Zinc Sheets etc.**—Sheets, 15g. and thicker, all English destinations, £109 12s. 6d., rolled zinc (boiler plates), all English destinations, £107 7s. 6d.; zinc oxide (Red Seal); d/d buyers' premises, £85 0s. 0d.

**Brass Tubes, etc.**—Solid-drawn tubes 1s. 9½d. per lb.; sheets to 10 w.g., 198s. 6d. per cwt.; wire, 2s. 8½d.; rolled metal, 198s. 6d. per cwt.

**Brass (Brazing).**—BS1400, SCB2, £177; SCB3, £174.

**Brass (High Tensile).**—BS1400, HTB1, £193; HTB2 £213; HTB3, £227.

**Gunmetal.**—BS1400, LG2, £212; LG3, £223; G1, 1½% £279; G1 ½% £295.

**Phosphor Bronze.**—BS1400, PB1 (AID released), £315; PB4 £301; BS1400, 90/10/1%, £301.

**Leaded Phosphor Bronze.**—BS1400, LPB1, £236.

**Phosphor Bronze Strip, etc.**—Strip, 303s. 3d. per cwt.; wire, 4s. 2½d. per lb.; rods, 3s. 5d.; tubes, 3s. 5d.; chill cast bars, solids 3s. 5½d.; cored, 3s. 6½d. (CHARLES CLIFFORD LIMITED).

**Nickel Silver, etc.**—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 11½d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 4½d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 3½d. All prices are net.

**Other Metals.**—Magnesium, ingots, 2s. 2½d. to 2s. 3d. per lb.; Antimony, English, 99 per cent., £230 0s. 0d. Quicksilver, ex-warehouse, £59 0s. 0d. Nickel, £660 0s. 0d. Aluminium, ingots, £186 0s. 0d.; aluminium bronze (BS1400), AB1, £240 AB2, £247.

# Company News

**Hadfields/Escher Wyss Deal**

Offer of £1,260,000 by Escher Wyss, of Zurich, for 60 per cent. of the £600,000 ordinary capital of the board and paper-making machinery manufacturing subsidiary, Millspaugh, Limited, has been accepted by the board of Hadfields, Limited. Hadfields will continue to hold one third of the Millspaugh stock, and will be represented on the board. As part of the agreement, Hadfields will receive the repayment from Millspaugh, within the next 12 months, of all the £1,260,232 outstanding balance of moneys loaned that company in recent years.

Sir Peter Roberts, chairman of Hadfields, in a letter to shareholders, explains that the problem of providing sufficient additional funds adequate to finance the development of both Hadfields and Millspaugh has been of concern to the board, and in the light of this the offer of Escher Wyss had been accepted. It is hoped that by combining the experience and know-how of the three groups that the future development of Millspaugh will be materially strengthened for the benefit of all the interested parties. Hadfields cash resources will be increased by about £2,400,000, but an overall capital loss of some £320,000 has to be borne, Sir Peter says.

In parallel with these negotiations, agreement has been reached, subject to Treasury approval, for the Black-Clawson Company, of the US, to purchase certain Canadian manufacturing interests which, so far as Millspaugh is concerned, have shown a bad past experience. Arrangements will be made for representation to be maintained in Canada by both Hadfields and Millspaugh. Overall, says Sir Peter, cash resources will be increased by £2,635,000 as a result of all the transactions.

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ASSOCIATED ENGINEERING, LIMITED—Net profit, after tax of £1,355,923 (£1,787,227), is down at £1,496,189 (£1,882,836). Final dividend is 8¼ per cent., making a 13¼ per cent. total. The same equivalent, adjusting for a 50 per cent. scrip issue, was paid last year.

STAVELEY INDUSTRIES, LIMITED—Mr. John P. Hunt, the chairman, assured shareholders that the board felt "fully justified" in maintaining the dividend. It could well be further maintained and possibly increased in the future, he said. Profits for the first four months of the current year compared "very well."

BRIGHTSIDE ENGINEERING HOLDINGS, LIMITED—Group surplus of £1,011,502 in the year ended September 30, 1961, compares with £1,061,113, and after tax of £539,099 (£543,352), there is a net balance of £472,403 against £517,761. Dividend of 20 per cent. is repeated with a final of 15 per cent.

WHITEHEAD IRON & STEEL COMPANY, LIMITED—The final dividend of 8¾ per cent. for the year ended September 30, 1961, makes a total of 15 per cent. on capital doubled by a scrip issue. A similar equivalent was paid for 1959-60. Group profits contracted to £1,053,624 (£1,446,830) and, after tax of £565,298 (£715,683), the net balance is £488,326 (£731,147).

FAIRBAIRN LAWSON COMBE BARBOUR, LIMITED, textile machinery manufacturers, etc., of Leeds—The chairman, Mr. W. Walker, announces reorganization of capital, and proposals providing for converting the preference and preferred ordinary shares into cumulative preference. It is also intended to propose arrangements for additional finance to deal with expansion plans.

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**Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, John Adam House, 17/19, John Adam Street, Adelphi, London, W.C.2. If received by first post Monday advertisements can normally be accommodated in the following Thursday's issue.**

## SITUATIONS WANTED

FOUNDRY EXECUTIVE (34). Comprehensive technical and practical experience grey iron and shell moulding. Qualifications: mechanical engineering, foundry technology and metallurgy, desires position in technical representative capacity. Box FE241, FOUNDRY TRADE JOURNAL.

A METALLURGIST IS OPEN TO SUGGESTIONS being laboratory trained and having held EXECUTIVE POSITIONS IN FOUNDRIES since 1957. Experience having been gained with all grades of cast iron and alloy irons including nodular. Using electric melting furnaces and hot blast cupola. Would prefer the West Riding of Yorkshire area but consider other locations. Car owner, H.N.C. Metallurgy engineering background. Any proposition received will be considered and treated in the strictest confidence. Box AM231, FOUNDRY TRADE JOURNAL.

## SITUATIONS VACANT

EXPERIENCED MAN required for Cupola, able to rebrick when necessary, and to keep clean offices. Flat over the foundry rent free. Apply WALTER W. HOSKEN LTD., 62, Willow Walk, Bermondsey, S.E.1.

OPERATOR required in New Year to take charge of small High Frequency Furnace, melting stainless steel. Some metallurgical knowledge essential, but would be prepared to train in use of high frequency furnace if necessary. New foundry near centre of Birmingham. This post offers particularly good prospects to right man. Please write giving fullest details. Box OR230, FOUNDRY TRADE JOURNAL.

YOUNG ASSISTANT METALLURGIST required to assist in laboratory and take charge of sand control. Foundry producing High Duty Iron Castings, North Wales area. Box YA246, FOUNDRY TRADE JOURNAL.

WORKS MANAGER wanted, under 45 years, for Whiteheart Malleable Foundry, West Midlands. Mechanised moulding unit, stump moulding, core shop, cupola melting, oil fired annealing. Give full career and salary. Apply Box WM233, FOUNDRY TRADE JOURNAL.

SOUTH AFRICAN OPPORTUNITY. British Foundry equipment manufacturers having associate company in Johannesburg require MANAGER for permanent residence. Applicants must have proved sales, administrative and technical experience in foundry machinery. Age group 30/40. Send full particulars, salary, to Box No. 718, DORLAND ADVERTISING LTD., 28 Haymarket, London, S.W.1.

## SITUATIONS VACANT—*contd.*

SHEEPBRIDGE ALLOY CASTINGS LTD., Hamilton Road, Sutton-in-Ashfield, Notts, have a vacancy for a REPRESENTATIVE to cover Lancs/Cheshire/Westmorland and Cumberland selling iron, carbon steel and stainless steel castings. Please write giving details of past experience, salary required, etc., to PERSONNEL MANAGER.

EXPERIENCED CHIEF METALLURGIST, FOUNDRY SUPERINTENDENTS (two) and PROCESS METALLURGIST required for large steel and iron foundries in South America. Familiarity with automobile castings production and the newer processes desirable. Contracts for 3/5 years or permanencies. Excellent service conditions, including passages, home leave, etc. Box EC239, FOUNDRY TRADE JOURNAL.

FOUNDRYMAN AND METALLURGIST experienced in iron, aluminium and precision casting, desires change preferably in smaller foundry where wide practical and technical knowledge could be used. Prepared to start precision foundry if capital available. Box FA247, FOUNDRY TRADE JOURNAL.

FOUNDRY ENGINEER, 30-40, National Foundry College trained; A.M.I. Mech.E. or equivalent an advantage. Practical foundry experience essential. To assist in engineering and implementing foundry and allied materials handling projects.

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Applications in confidence to THE SECRETARY, CAMPBELL, GIFFORD & MORTON LTD., Consulting Engineers, 52, Queens Road, Weybridge, Surrey.

### COUNCIL OF IRONFOUNDRY ASSOCIATIONS

### EDUCATION AND TRAINING

The Council is expanding its Training Services to the industry and invites applications for the appointment of an

### EDUCATION OFFICER

The appointment is mainly concerned with the organization and supervision of management and supervisory courses, general and technical, which are being rapidly expanded to meet the industry's demands, and to assist the Head of the Section generally. There will be a considerable amount of travel within the U.K.

Candidates should preferably be under 35 years of age and hold a degree or N.F.C. Diploma or similar technical qualification. Knowledge of the ironfoundry industry and teaching ability and experience would be an advantage.

The appointment is based in London and a salary appropriate to qualifications and experience plus excellent pension scheme is envisaged.

Forms of application can be obtained from the Head of the Education and Training Section, 14 Pall Mall, London, S.W.1.

## SITUATIONS VACANT—*contd.*

FOUNDRY SUPERINTENDENT required by East Midlands Jobbing Ironfounders having approximately 100 employees. The successful applicant must have both supervisory and technical experience coupled with a high degree of drive and initiative. Permanent position with good promotion prospects. Preferred age group 25/35. Full details in confidence to MANAGING DIRECTOR, Box FS236, FOUNDRY TRADE JOURNAL.

ASSISTANT FOUNDRY MANAGER required for jobbing Foundry making castings up to 20 tons. The position offers scope for improvement and the duties will be mainly the setting out of moulding and coremaking operations and time control of same. Applicants must have had good practical experience of moulding and coremaking although the position will be fully supervisory. Must have had previous experience as a Foreman or Manager. Age group approximately 40/45 years. Manchester Area. Box AF227, FOUNDRY TRADE JOURNAL.

## PATENTS

THE proprietor of the British Patent No. 781233, entitled "Blast furnace cooling plate holder," offers same for license or otherwise to ensure practical working in Great Britain. Inquiries to SINGER, STERN & CARLBERG, 140 So. Dearborn Street, Chicago 3, Illinois, U.S.A.

THE Proprietor of Patent No. 699318 for "A Regenerative Refractory Furnace for Endothermically altering a Gaseous Material," desires to secure commercial exploitation by Licence or otherwise in the United Kingdom. Replies to Haseltine Lake & Co., 28, Southampton Buildings, Chancery Lane, London, W.C.2.

BRITISH PATENT No. 716175. "Improvements relating to heat protective garments. Proprietors desire secure commercial exploitation by licence or otherwise. Replies to H. D. FITZPATRICK & Co., 3 Gray's Inn Square, London, W.C.1, and 94 Hope Street, Glasgow, C.2.

## AGENTS

PART-TIME AGENT required by North of England Ironfoundry seeking to expand present field of activities. Reply stating experience, type of connection and area covered to Box PT242, FOUNDRY TRADE JOURNAL.

MASTER PATTERNMAKERS in Lancashire, with good connections, seek agency to sell Foundry Requisites and Steel Castings, etc. Commission basis. Box MP238, FOUNDRY TRADE JOURNAL.

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SMALL Aluminium or Non-ferrous Foundry wanted in Midlands area. State details to Box SA224, FOUNDRY TRADE JOURNAL.

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STEEL BAND CONVEYOR required for Foundry Core Shop. Write stating price and condition to Box SB203, FOUNDRY TRADE JOURNAL.

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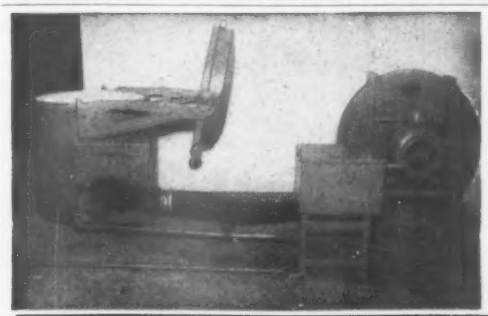

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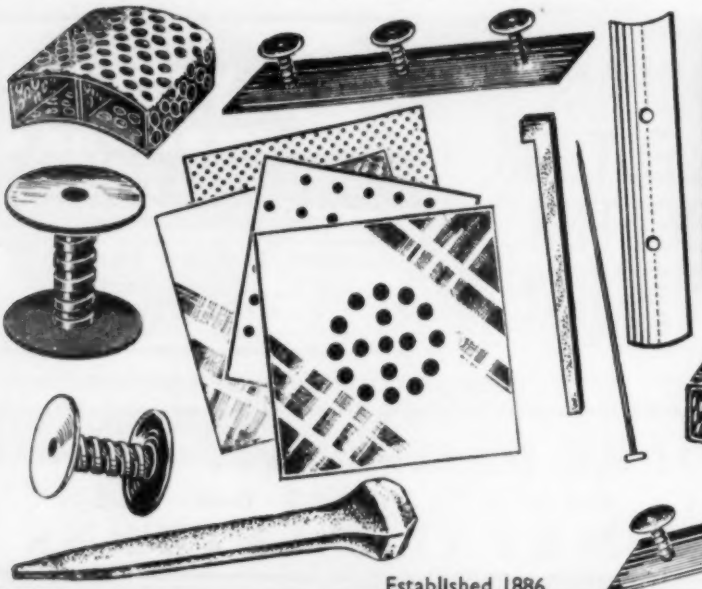

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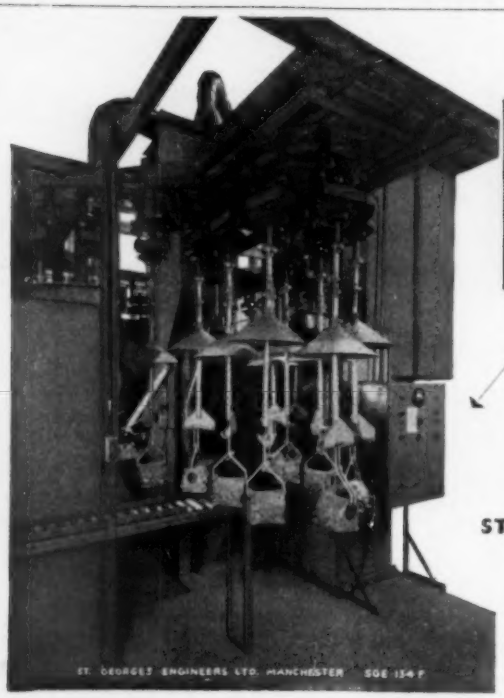


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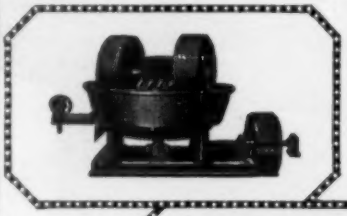

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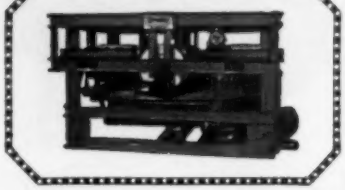

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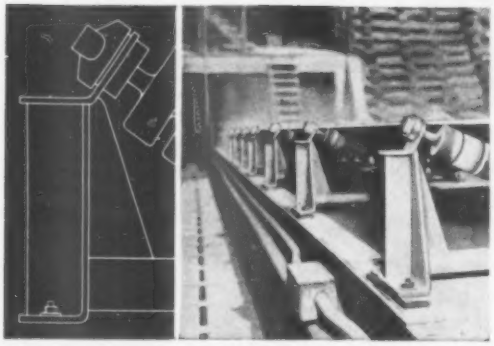

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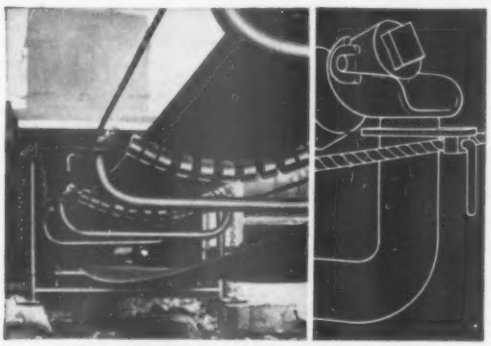

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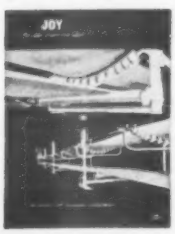


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Published by the Proprietors, INDUSTRIAL NEWSPAPERS (FUEL & METALLURGICAL), LIMITED, John Adam House, 17/19, John Adam Street, London, W.C.2, and printed in Great Britain by HARRISON & SONS, LIMITED, by Appointment to Her Majesty The Queen, Printers, London, Hayes (Middx) and High Wycombe.

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VOL. III
No. 2350
Registered at the G.P.O. as a Newspaper

DECEMBER 21, 1961
Offices: John Adam House, John Adam St., London, W.C.2

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